A Database Publication

THE MICRO USER

Volume 7
Number 9
November 1989
£1.50

Top-selling guide to the BBC Micro, Master, Archimedes series and A3000

MONSTER MAZE
3D arcade action: The full listing

DTP
Simple techniques to incorporate graphics

FRACTALS
Ordered displays from random starts

GOLF
Learn how to play – the expert way

LABELS
Professional quality from your dot matrix

SCREEN BLANKER
Protect your screen and hide your secrets

BODY BUILDING
Micro control is just a whistle away

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- Advanced Disc Utilities
- Master rom board
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- Symbolic Algebra
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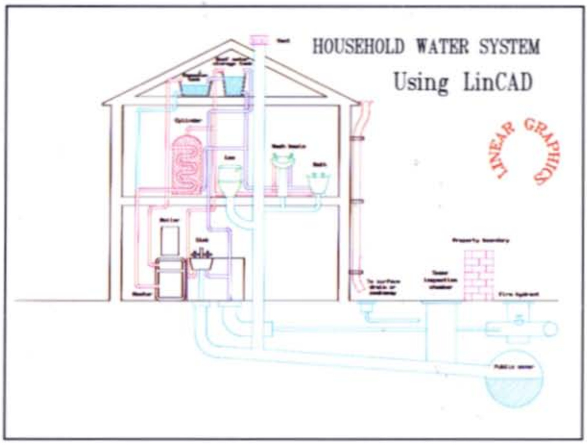
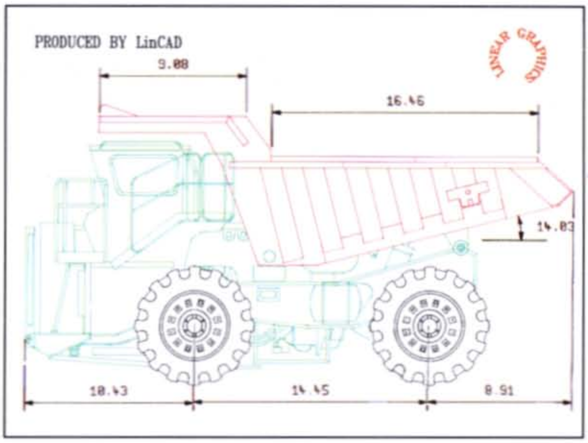
...plus all the latest games

NOW!...Digitised sound on the Archimedes





LinCAD Archimedes

To complement the advanced performance and technology of the Acorn Archimedes, Linear Graphics have developed LINCAD ARCHIMEDES – an equally advanced design, draughting, and graphic communication package. Release 1.0 of LINCAD ARCHIMEDES provides the foundation for a sophisticated 2D computer design tool suitable for a wide range of applications in education.

EASY TO USE

LINCAD ARCHIMEDES has been designed with the user in mind. The number of required keystrokes, either keyboard or mouse, have been minimised to speed up data entry. Pull-down menus are used through-out with extensive use of the mouse. Comprehensive use is made of help screens to aid the user. The package is self-adapting to the memory size and the monitor type of the ARCHIMEDES system in use.

NATURAL SCALING

LINCAD ARCHIMEDES provides a practical solution to the problem of switching between drawing and real-world environments. The screen drawing area resembles an A3 draughting area with fixed notional 1 cm intervals. The co-ordinate system however can be scaled from 0.1:1 up to 1,000,000:1. At all times you know the actual plot output size and the scaled size it represents.

DRAWING ELEMENTS

LINCAD ARCHIMEDES supports all of the commonly used drawing elements and more:

LINE
TRIANGLE
ELLIPSE
POLYGON
ARC
SPLINE
OPEN BOX
OPEN CIRCLE
DIMENSION
FILLED BOX
FILLED CIRCLE
TEXT

Advanced aids for drawing lines include horizontal or vertical grid-lines, parallel, tangential to arc or circle, tangential to two existing circles, perpendicular, at angle, bisector to a line, and perpendicular bisector to a line and bisector to two lines. Arcs, circles and ellipses may be drawn by specifying points or an extensive combination of points and parameters.

Drawing aids for arcs include arc through three points, arc by start, end and final centre point, arc by centre, start, and final end point, tangential extension to line and automatic filleting.

Construction aids for circles include tangential to two or three lines and tangential to line, arc or circle.

A further interesting feature is a dynamic mirror facility, a mirror plane can be positioned anywhere in the screen drawing area, any subsequent operation is reflected across in both directions across the mirror. This allows the user to judge the worth of the combined reflections as they happen,

The user has the choice of two text fonts. In addition text size, aspect and slope may be altered. Text following of circles and arcs allows scope for imaginative use for graphic communication.

Automatic hatching in any colour, hatch angle and pitch is provided. Any complex enclosed shape can be hatched in.

DIMENSION FEATURES

LINCAD ARCHIMEDES has a powerful auto-dimensioning feature that allows you to create complete dimensions by simply entering two locations. Leader lines, witness line, arrowheads and dimension value are automatically laid out.

Dimension types include horizontal, vertical, linear, diametric, radial, and angular.

If an element that has been dimensioned is subsequently changed in size using the group scaling command then the dimension value will automatically change as well to match exactly the new size.

A measure facility allows you to investigate all the parameters associated with a particular drawn item.

POINT LOCATION

Data points may be entered using the mouse pointer, all the data points are constrained to the grid lock spacing in use, however the lock spacing varies from .1 mm to 10 cm (actual size) allowing very fine control.

Snap to nearest point allows drawn items to exactly position with their nearest neighbour.

Data points may be entered via the keyboard as cartesian coordinates, or relative coordinates, or polar coordinates.

DISPLAY COMMANDS

Display commands are available using either function keys or the mouse pointer to zoom (up to 32 times), scroll or redraw the drawing. Because of the Archimedes high processing speed, drawing manipulation and redraw speeds are exceptionally fast.

SYMBOL LIBRARIES

LINCAD ARCHIMEDES will allow you to make any collection of items into a symbol. In this way symbol libraries may be compiled to suit any application. Symbols may be drawn at any scale or angle, copied, mirrored or distorted.

Drawings in HP-GL format (Hewlett-Packard Graphics Language), DXF format or Linsign format (Linsign is a poster design package available from Linear Graphics) may be imported into Lincad Archimedes.

TRACKING FUNCTION

A sophisticated tracking function automatically generates a track, with a set width from a series of straight lines. The generated track may be designed with either sharp corners, or corners rounded off by arcs or fillets or alternatively two spline curves are generated.

The tracking function may be used in conjunction with a regular polygon generator to easily generate cogs, wheels and other shapes that have a rotational symmetry around their perimeter. The symmetrical section is first stored in a track-file and then that section is repeated for each side of the polygon, in its correct angular position and size. Concentric symmetrical shapes can easily be built up.

EDITING

LINCAD ARCHIMEDES supports a wide range of editing functions that make the package both an exciting and useful C.A.D. tool. The block editing commands consist of:

ERASE
COPY
MIRROR
LOAD
ROTATE
DISTORT
SAVE
SCALE
BEND
MOVE
ROTATE & SCALE
CONVERT

The DISTORT command allows you to distort sections of a drawing into perspective or isometric views. The CONVERT command alters objects such as circles, or arcs into vectors to allow the DISTORT command to operate.

A number of single item editing commands are available:

ERASE
ADJUST CURVES
ALTER COLOUR
ERASE PART
MOVE ITEM
ALTER STYLE
CONVERT
COPY ITEM
EXTEND
ADJUST LINE
MEET LINES

The ERASE command operates on single items such as lines, circles and arcs while the ERASE PART operates on sections of single items that lie between intersections. The ADJUST commands allow lines and arcs to be altered in end-position and arc angle respectively. Extend command increases line length while the MEET LINE extends two lines together to meet at the calculated intersection.

All items of the same colour can be treated as a single layer allowing editing on just that layer. Items can be moved between layers using the block colour change command.

OUTPUT

Output is to the Plotmate A3M Single pen or Multi-pen or the Plotmate Plus graphics plotter. As the screen display area represents an A3 sheet, there is a direct relationship between the screen and the final output size and position. It is also possible to plot just the magnified section of the drawing to the plotter.

The Centronics interface of the Archimedes is used to drive the Plotmate Plotter transmitting the BBC VDU command stream.

Linear Graphics Ltd,
Unit 39,
Mochdre Industrial Estate,
Newtown,
Powys SY16 4LE
Tel: 0686 629292
Fax: 0686 629563

LINEAR GRAPHICS

MORLEY ELECTRONICS

TELETEXT ADAPTER
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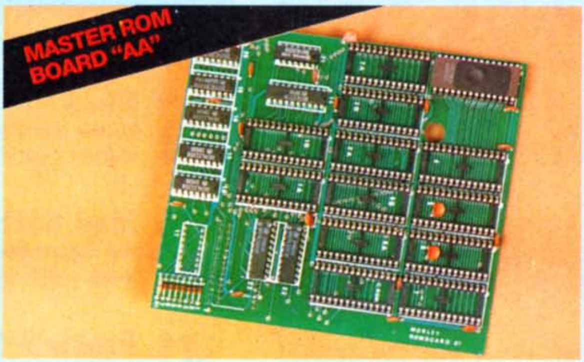
TELETEXT ADAPTER



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MORLEY
V2

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- ☐ Programmes 27128/2764/27256 Eproms: 12 and 21 volt.
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MASTER SMART CARTRIDGE
CARTRIDGE
SMART CARTRIDGE
WARNING
Please insure that this label faces the back of your Master Computer
MORLEY
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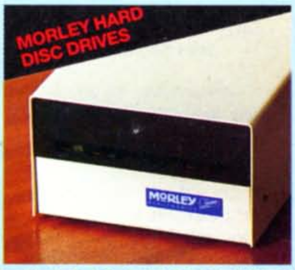

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SOFTWARE ... SOFTWARE ... SOFTWARE ...

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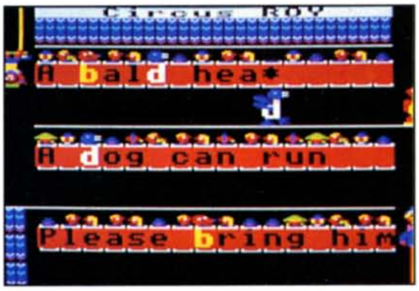

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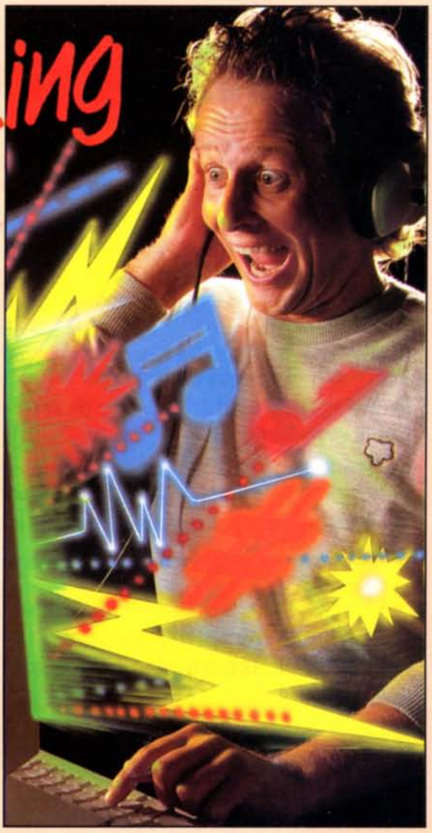
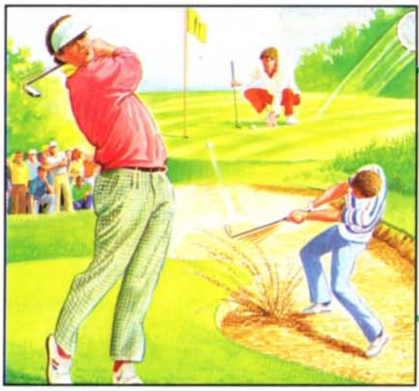
Amazing Audio

Capture whole worlds of sound in your Archimedes using the incredible Armadeus software from Clares. We put it through its paces and you find out just how good it is with some of our own samples on the 3.5in monthly disc that comes with your subscription. See Page 18.





Holed Out!!

As the golfing craze continues to sweep the micro world find out what you've got when you've scored an eagle and whether a wood is better than an iron when the going's in the rough. See Page 107.

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 124** to find just what you're looking for – from cheap modems to complete computer systems.

Next month in THE MICRO USER

JINGLES
Fun sounds for Christmas.

INTERDICTOR
The ultimate flight simulator?

UTILITY
Finding files on your Archimedes.

EDUCATION
The real future for micros?

✓ **For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.**

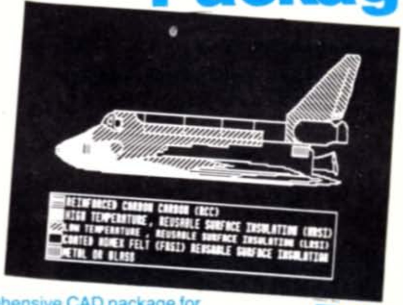
✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

Basic Booster ROM From BEEBUG

A selection of useful utilities to 'boost' the Basic in your computer and give more power to your programming.
All items have been carefully selected among programs published in various issues of BEEBUG magazine, and are also available as a Rom image on disc.

- **Super Squeeze** a program compressor which can remove REMs, blank lines, spaces, and compress variable names.
- **Partial Renumber** A very useful utility which renumbers a selected block of lines. Ideal for adding extra lines to the middle of a lengthy program.
- **Smart Renumber** Renumber a program to a standard format with procedures starting at a particular line number.
- **Program Lister** List any program (including Archimedes Basic) direct from a file.
- **Textload and Textsave** Save and load a Basic program as text. Saves the hassle of using *SPOOL and *EXEC.
- **Resequencer** Rearrange the lines in a Basic program.

ASTAAD CAD Package


REINFORCED CARBON CARBON (RCC)
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COATED NOMEX FELT (FRSI) REUSABLE SURFACE INSULATION
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- 8 page manual covering the use of the system
- Sample picture files to experiment with

JUST A FEW OF MANY...

This is just a sample of the many useful programs that subscribers have received free in BEEBUG magazine. Each issue is crammed full of:

- handy utilities
- useful applications
- hints and tips on programming
- communications
- tutorial articles on getting the most out of your computer
- reviews of all the latest products for your machine
- educational programs
- games

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NEWS *beat*

Warm welcome for A3000

Representatives of leading software houses at Acorn Games Conference

THIRTY software houses voted with their feet when Acorn organised a games conference to aim the new A3000 at the high end of home entertainment.

Representatives of Ocean, US Gold, Virgin Mastertronic, Activision, Domark, Grand Slam, Logotron, Mindscape and Electronic Arts were among those who turned up at the Hilton National in Watford to show their interest in the games potential of the 32-bit micro.

Gary Bracey: "Lovely machine"

Acorn executives briefed the delegates on the company's marketing strategy for the A3000 revealing details of a new developers' package for the machine.

Ocean's Gary Bracey summed up the event when he said: "It's a lovely machine and I'm sure we will be doing something for it. From what I have seen and learned today, the A3000 deserves only our highest profile titles such as Batman and The Untouchables".

Similar sentiments came from other members of the audience.

"We can't fault the A3000", said Steve Clark, technical manager for Virgin Mastertronic. "The next stage will be to undertake a pilot product for it". Martyn Wilson, sales director of CDS said that his company had already been making plans to support the A3000.

"We began thinking about it around a month ago", he said. "Now we are going to start work on Archimedes versions of Colossus Chess, Colossus Bridge and Steve Davis Snooker".

Domark already has at least two major titles underway for the A3000.

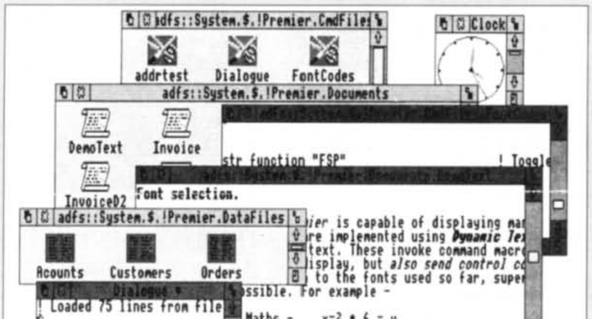
"We are currently working on both Trivial Pursuits and Hard Drivin' for the A3000", said development manager John Cavanagh. "In fact, we hope to have a demo version of Hard Drivin' ready for the PC show. Running four times faster than any other format, it will be our flagship.

"Our reason for getting into this market so quickly is the level of support we have received from Acorn. Everything they have said at the conference today is true and we are with them all the way".

Acorn is well pleased with the conference's success. "Considering it was held at relatively short notice and slap bang in the middle of the peak holiday period, we couldn't be more delighted with the turn out", said Simon Lovesey, marketing manager – home markets.

"Just about everyone who is anyone in the games market was there. We are confident that the A3000 will now enjoy considerable support from the games industry, ensuring it becomes the most sought after computer for quality home entertainment".

Martyn Wilson: Supporting A3000



adfs::System.$.!Premier.CmdFiles
addrtest
Dialogue
FontCodes
Clock
adfs::System.$.!Premier.Documents
DemoText
Invoice
InvoiceD2
adfs::System.$.!Premier.DataFiles
Acounts
Customers
Orders
Dialogue

```
str function "FSP"                    ! Toggle
Font selection.
ier is capable of displaying man
re implemented using Dynamic Tex
text. These invoke command macr
isplay, but also send control co
 to the fonts used so far, super
ssible. For example -
Maths -    x-2 * 6 = y
Chemistry  H2SO4
```

```
! Loaded 75 lines from file
 
page = 2,60,2,4
pagemode=on
! Page mode turned on.
```

Circle Software's Text processor Premier 2.04

Better way with words

VERSION 2.04 of the Archimedes text processor Premier is now available from Circle Software (0793 770021).

An enhanced command language is one of several new features of this latest version which also supports more text and integer operators. Premier 2.04 costs £110 with free upgrade for existing users plus educational discounts.

Attention!

A3000 & Archimedes 400/1 Series Owners

Complete On-site maintenance for just

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This maintenance is for one year and includes:

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- Optional 3 year 'Peace of Mind' cover available
- Nationwide cover provided by Cray Electronics PLC for Beebug

Beebug are now providing free on-site maintenance with all A3000 and Archimedes 400/1 series computers purchased after September 14th.

Until 31st October we are able to offer this service to existing owners of an A3000 or 400/1 series Archimedes for just £25 plus VAT. If an Acorn monitor was purchased with the computer, this may be included for an additional £10 plus VAT.

You will need to be a Beebug/RISC User member to benefit from this service, and may subscribe for £14.50 at the same time.

Apply now enclosing serial number of computer and monitor (if applicable) and date of purchase along with the appropriate payment/credit card number to:

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New drives for R140

HUGH Symons (0202 740853) has introduced a new series of peripherals for Acorn's R140 Unix workstation. They include three hard disc drives, a tape streamer and a 19in high resolution monitor and coincide with the release of a four-port RS232 expansion card which turns the R140 into a six-user machine.

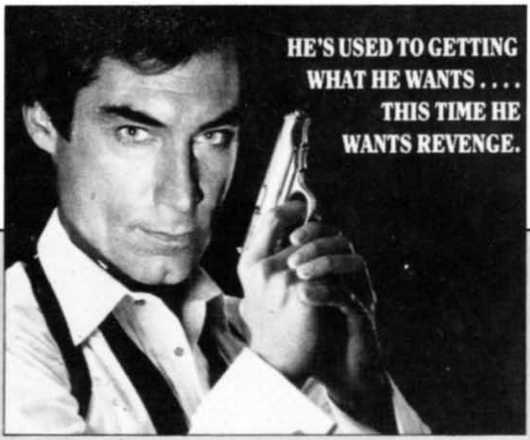
The new drives and streamer are free standing units which take advantage of Acorn's recently released SCSI interface. The 65Mb version costs £795, 182Mb £1,495 and 380Mb £2,270.

Operating at 90in a second with 150Mb capacity, the quarter inch tape backup system has a data transfer rate of 6.5Mb per minute. It costs £985.

With a resolution of 1152 x 900 pixels, the 19in Viking II mono monitor has a video band width of more than 110MHz for £999.

Allowing users to exploit the already ported multi-user software which includes Uniplex, Quadratron's Q-Office and relational database products such as Sculptor, Sea-Change and Informix, the expansion card costs £449.

Acorn's Unix product manager David Slight said: "The addition of this multi-user capability gives the R140 unbeatable value as an entry-level Unix system appealing to a much wider commercial and industrial audience".


HE'S USED TO GETTING
WHAT HE WANTS....
THIS TIME HE
WANTS REVENGE.

Bond's back

A RACE in a stolen crop duster, a confrontation with sharks and a helicopter chase prove James Bond is back on the computer screens with a vengeance.

Licence to Kill is the latest 007 offering from Domark. It follows the plot of the current hit film with Timothy Dalton as a new tougher Bond on a personal vendetta against drug runner Sanchez.

BBC Micro cassette costs £12.99 and disc £14.99.

Cray link for Beebug

CUSTOMERS will benefit from a powerful link forged by Beebug.

After signing an exclusive contract with the technical services division of the massive Cray Electronics Holdings group, Beebug is now offering free one year on-site maintenance with all A3000 and Archimedes A400/1 series computers sold by them.

This can be extended to three years by a payment of £113.85.

"In conjunction with Cray Technical Services, we have invested tens of thousands of pounds in this project to ensure that the service will be of the highest standard", said Beebug director Adrian Calcraft.

"The new A3000 and A400/1 series computers are a technological breakthrough and represent excellent value for the home, office and education.

"We have every confidence in these machines and feel that it is time that Acorn customers benefited from the peace of mind that only on-site maintenance can bring".

People who already own an A3000 or A400/1 can register for the one year contract before October 30 for £28.75.

Three ways to speed

TO increase the scope and flexibility of many standard Econet systems, three new Archimedes software products have been released by Software Solutions (0954 211760).

Its Disc Sharer allows the hard disc of one Archimedes to be accessed by up to 32 other Archimedes and BBC Micro users. Because it is multi-tasking, the disc sharer can be in operation while the micro is also being used for other purposes.

Solutions' new Printer Spooler is also a time saver. It allows a printer connected to an Archimedes to be accessed transparently from other micros on the network but eliminates the waiting time by storing files temporarily on disc until the printer becomes free.

Users can send files and carry on with their work while the spooler takes care of the printing.

Remote Logon allows full, password protected access to the hard or floppy disc drive of an Archimedes from any other Econet station.

The Disc Sharer costs £158.13, Printer Spooler £93.44 and Remote Logon £43.70 with corresponding education prices of £126.50, £74.75 and £34.96.

Arc handles your pay

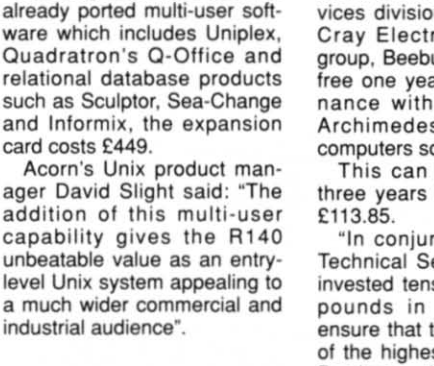
THE time-consuming task of organising a payroll can now be taken over by the Archimedes thanks to a package which developer Caldergien (0282 866481) claims is the only complete payroll program for the 32 bit micro on the market.

What would previously take all day to produce can now be done in 20 minutes according to the Lancashire based firm which has just released an improved version of Payroll.

In addition to all tax and national insurance tables, it also implements all sick and maternity pay rules and keeps a full record of payment from year to year.

Payrolls for more than one

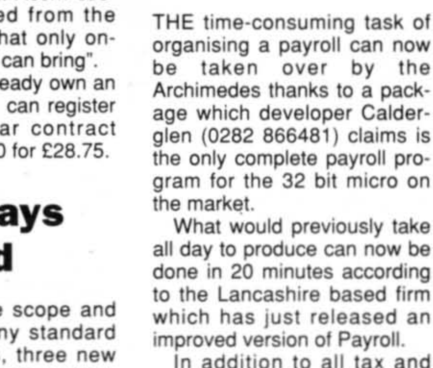
Turn to Page 11 ▶



Rad aims for teens

TEENAGE BBC Micro owners in the market for cheap games titles are the main target for Rad, a new budget games range from The Edge (01-831 1801).

Alien Syndrome and Soldier of Light are the first two BBC Micro titles planned. Jim Loftus of The Edge told *The Micro User* that release of these £2.99 games was "imminent".



FREE ON SITE MAINTENANCE

with all A3000's and Archimedes

FROM BEEBUG

the Archimedes Specialists

Special Offers

In addition to On-Site Maintenance, if you subscribe to BEEBUG or RISC User, (or take out a new subscription) and purchase an Acorn A3000 we will also supply: Fish, Pacmania, Printer Lead, 10 x 3.5" Discs and Lockable Disc Box. With an Archimedes purchase you can choose FREE goods to the values shown below:

	Colour System	Entry System
A410/1	£123	£110
A420/1	£180	£167
A440/1	£272	£259

0% Finance

As a licensed credit broker, Beebug can offer you 0% finance over 9 months or 13.75% flat rate (typical APR 28%) over 12,24 or 36 months. Please phone to check the members special offers with 0% finance.

Speedy Service

We have a new showroom in St. Albans where you can see and try any of the systems. They are always on display and in stock. Our Mail Order Service is also very efficient, with over 80% of orders going out the same day. 48 hour fully insured delivery charges on complete system are just £7.00 and 24 hour delivery £11.50.

Technical Support

Unlike many dealers we don't lose interest as soon as you have made your purchase. You can always telephone our Technical Support Department or Showroom for some friendly and impartial advice.

Archimedes Magazine – RISC User

RISC User is the leading magazine dedicated solely to the Archimedes and A3000. For £14.50 a year (UK), you will receive this 56 page magazine packed full of useful information, news, reviews, programs, hints and tips etc; mailed directly to your home 10 times a year.

Ordering

All items are currently in stock. Prices are exclusive of VAT, please add 15%. We accept payment by cash, cheque, Visa, Access, Connect etc as well as official orders. You may order by phone, fax or letter. Alternatively please phone for more information.

COMPLETE CONFIDENCE

Quite simply this means that if your Archimedes goes wrong within the first year, an engineer will call at your premises within 24 hours to repair it. If it cannot be repaired, a replacement will normally be left.

NATIONWIDE COVERAGE

Beebug are using CRAY ELECTRONICS PLC to provide the maintenance cover which is available throughout the whole of mainland UK. Simply make one phone call and an engineer will call. There is no limit to the number of call-outs that you can make over the year.

ALL ARCHIMEDES & A3000

This service is included on all new A3000, A410, A420 and A440/1 systems sold by Beebug from September 10th 1989. It also covers the Acorn monitor if sold at the same time.

PRICES	BASE	COLOUR
A3000	649.00	869.00
A410/1	1199.00	1419.00
A420/1	1699.00	1919.00

GUARANTEE

As a BEEBUG customer you can rely on our guarantee of unbeatable service and support.

BEEBUG

117 Hatfield Road, St. Albans, Herts AL1 4JS.
Tel: 0727 40303 Fax: 0727 60263

◀ From Page 9

company can be run on the system which also incorporates many other features and costs £99.95.

Training by BBC Micro

ONGOING technical training can be a real headache for huge organisations with thousands of staff spread throughout the country.

Remedies are often financially unpalatable but vast rental and retail company Granada UK has harnessed BBC Micros to provide a cost effective method of keeping its technicians on the ball.

Development manager Grahame Sanders, head of Granada's internal training, faced the daunting task of providing it for more than 3,000 rental and Serviscope technicians in over 120 locations.

His answer is a range of courses on BBC Micro discs that has already been well received within Granada UK (0234 226486) and is now being made available to other companies.

"I was asked to look into the possibility of using micros to aid training our technicians", he told *The Micro User*. "Having spent some time looking at interactive systems using PCs, video and laser disc, the cost of setting up systems in the 120 locations and producing materials to run on them did not appear very cost effective.

"Much of the off the shelf material available did not meet the needs of the company, so I decided to try this low cost experimental system to test its acceptance at technician level and its effectiveness."The BBC Micro was chosen mainly because I already had one in the office. The resulting discs covering a range of topics have so far been well received".

Produced under the title Granada CTS Learning Services, they cover such subjects as VHS analogue servos, transistor configurations and A/D, D/A conversions.

They come with program instructions and are easily followed with clear diagrams and some constructive test exercises.

FEDERAL RESERVE NOTE
THE UNITED STATES OF AMERICA
E15638529A
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ONE DOLLAR

Dollar scanned with i-Scan

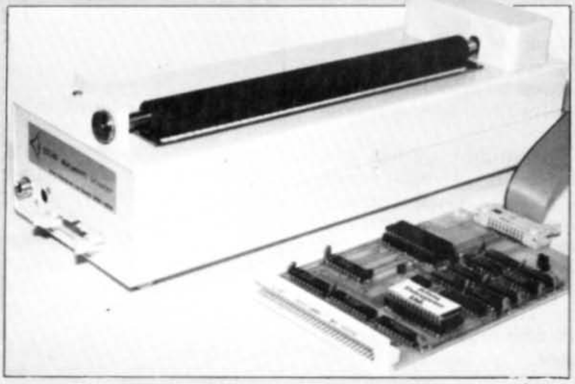
Desktop scanner for Arc

DESIGNED specifically for the Archimedes, i-Scan is a desktop motorised scanner which produces high quality images in true grey scale for use in desktop publishing and graphic art.

From Irlam Instruments (0784 451192), it features friction feed for accurate scanning of documents from postage stamp size up to A4 width.

It scans at 200dpi with true 16 level grey scale and conforms completely with Risc OS.

The i-Scan has easy contrast settings for scanning unclear images and is upgradeable to cater for higher resolutions.



Flying high

CLARES Micro Supplies (0606 48511) has launched a new flight simulator for the Archimedes.

Called Interdictor, it has been developed by former British Aerospace staff who have worked on real simulators and is based on a generic fly-by-wire plane. It can be used with a joystick and sells for £34.95. Such has been the success of Clare's sound sampling package Armadeus that demand recently outstripped supply.

"With so many other systems on the market we did not know what to expect", said David Clare. "The demand for our boards took us by surprise.

"We think the reason could be that that they are designed to work very closely with the software and give very high quality output. We are now ramping up production to meet demand".

All you need to know about the Archimedes

PUBLISHERS of *The Micro User*, Database Publications (0625 878888), has joined with Acorn Computers to produce *Acorn Computing*, an official guide to the latest software and hardware developments for the Archimedes series of machines.

With an increasing number of developers producing Archimedes products, popular demand gave rise to this 92 page publication which includes new products for the latest BBC Micro, the A3000, which is part of the Archimedes series.

Publication was timed to coincide with the start of the PC Show on September 27 and Acorn ordered an initial 20,000 copies from the first print run. A reprint is already planned and such is the volume of new software now being written for the Archimedes range that a completely new edition is expected in the New Year.

Nearly 10,000 copies were to be handed out to people visiting the Acorn stand at the PC Show and they will also be sent to everyone buying a new Archimedes machine, including the thousands who have already ordered an A3000. The balance will go to dealers, schools and people inquiring about Acorn products.

From Acorn, product manager for BBC and Archimedes products David Bell said: "Acorn Computers is particularly pleased that this guide has been produced in cooperation with Database Publications, whose expertise in the world of publishing and computing is well known".

The micro telegram

FOR the first time Acorn computer users can use their micro to send a telegram to any home or office in the world. This is one of the many new services now available on MicroLink following its tie-up with data network Istel.

The MicroLink Wine Club is another new facility. It includes a wide range of special wine offers, expert advice on vintage wines and the best buys, plus details of vineyard holidays at special prices.

Two major games are claimed to set new standards in multi-user adventures. One, Federation II, has more than 900 locations and has been described as a cross between Monoply and Star Trek. Players wander the universe working for money to buy food then fighting for power in social, economic and political life.

The second is Bloodstone, a huge role-playing adventure capable of supporting millions of characters. It combines loving, killing, buying and selling in an environment which can be constantly changed.

Since the beginning of October, 98 per cent of people in the British Isles can access MicroLink for the cost of a local phone call.

Switch at Superior

CHANGES have been made at Superior Software (0652 58585). Marketing and distribution of the company's product is now being handled by new company Superior Microcomputing Ltd and the operation has moved from its Leeds base to 3 Manor Drive, Scawby, Brigg, South Humberside.

Designer upgrade

SILICON Vision (01-422 2274) has upgraded its Archimedes design package ARC-PCB with the new and faster ARC-PCB Professional.

It features quicker automatic routing, oval and circular pads with fully variable sizes, pull-down menus, clear pad holes for hand drilling, faster redraw, extended libary part manipulation, 24 pin and 9 pin printer support, batch capability for artwork printing, improved plotter driver with parameters for all plotting options plus component pulling and instant editing operations. Price, £375.

Also new from Silicon is Solids Render which provides powerful ray tracing capabilities for the Archimedes producing photo-realistic images of 3D scenes which take into account light sources, reflections, shadows, transparencies, refractions and textures. It costs £79.95.

Completing the line-up of new products is RoboLogo, a new extension of traditional Logo giving 3D control of an articulated human or animal figure through the use of a standard Logo language. Commands such as walking, turning and bowing are automatically translated into the natural movement of the graphics figures. Price, £69.95.

Jonh Barr

Richard Sumner

Chris Humphries

Moving up at Acorn

ACORN has announced three new appointments. The newly-created position of finance director goes to John Barr who previously spent 15 years with Rank Xerox where he held a number of finance posts in manufacturing, engineering and on fiscal policy development and legal consolidations.

In a move to expand overseas sales of the Archimedes and Unix workstations, Richard Sumner fills another new job as international market development manager. Before joining Acorn, he spent five years as an independent information technology consultant and was also responsible for establishing Software Arts outside America.

Completing the new line-up is Australian born Chris Humphries who joins Acorn as sales manager. He was previously with ICL Interactive Learning Systems.

Put on a new face

DESIGNED for use on any BBC Micro or Archimedes, a new collection of typefaces for the Star LC-10 printer has been developed by Ian Copestake Software (051-648 6287).

They are downloaded to the printer from disc and can be used with most word processors. Fonts produced so far are Black, Caldy, Outline, Pensby, Raby, Shadow and Universal. Individually they cost £9.90 but as an introductory offer, customers can order any three for £24 or the whole collection of seven for £44.

Five years after it released version one of Wordpower, its word processor for the Acorn range, Copestake has decided to make it available as shareware.

Customers can obtain Wordpower and complete documentation for £5. If they want to become registered users they can pay the rest of the purchase price. If not, they can keep the package, or if they return it in perfect condition within two months can have the £5 refunded.

Bundle of fun

TWELVE games have been bundled with the A3000 in a Hyperpack from Cambridge International Software (01-833 4023).

Exclusive to the pack is the Magnetic Scrolls adventure game Jinxter which is teamed with Orion, Repton 3, Word Up Word Down, Quazar, Star Trader, White Magic, Holed Out, Pacmania, Terramex, Conqueror and Corruption.

Worth more than £300, the games come with the A3000 and joystick for £699. Hyperpack alone costs £85.

CIS also has plans for a series of packs with four titles. First of these will include

Turn to Page 14 ►

Play it on a Panda

A SELECTION of Ample DCT Music 5000 and Music 500 files are now available on disc from Panda Discs.

Ample DCT is the free Hybrid support service provided on Dudley College of Technology's 24 hour on-line viewdata system available to callers with Prestel compatible equipment on 0384 239944.

There are six new Music 5000 discs: Monster Compilations 1 and 2, Phil Comber I, Bernie Dawson I, Paul Nuttall I and Andy Knight I. Music 500 releases include complete Oxygene and Equinox suites and Island Music Data Files by Richard May volumes 1 to 3 with 25 files on each disc.

All 80 track 5.25in discs cost £5.

CJE micro's

2 & 4 MB Ram Expansion For The Archimedes 310

CJE Micro's 320/340 RAM expansion board provides the ideal upgrade path for Archimedes 310 owners. The board can be supplied with 1MB fitted giving 2MB total or 3MB fitted giving 4MB total. The 1MB board can have 2MB more RAM fitted at any time. The extra memory is functionally the same as a 400 series.

Available Now

Professional fitting is required, so collection, fitting and return of your computer is included in the price.

Upgrade 1MB to 2MB £380, 1MB to 4MB £600

Prices include VAT

Please phone to book your upgrade fitting.

BBC A3000 NOW IN STOCK

Phone for details of SPECIAL DEALS on A3000 & 400 Series

Phone/Credit Card/Official Orders/Trade and Export orders welcome.
Officially approved ACORN Dealer and Service Centre

Demonstrations available

A3000
Memory Expansion
Now Available
2nd MB £180 inc vat
User Fittable

C.J.E. MICRO'S (Dept. MU),
78 Brighton Road, Worthing,
W. Sussex BN11 2EN

0903 213361 (3 lines)

◀ *From Page 12*

Fireball II and Guild of Thieves and will be due for Christmas release at a price between £30 and £40.

Graphics galore

MICRO Studio (0353 720433) has announced a new Archimedes graphics library for use with the Acorn Desktop Publisher. It costs £17.25.

Also available is a £19.95 colour graphics library for any Risc OS application.

Therapy on a disc

A PROGRAM originally designed for the rehabilitation of stroke patients has been adapted to help a wide variety of people with speech disorders.

After a pilot study at Sheffield City Polytechnic, the speech therapy program Cued-In is now on the market from System Applied Technology (0742 768682).

Cued-In was developed by collaboration between speech therapists at a Sheffield hospital and computer programmers at the local polytechnic. With it, speech therapists can create tailor-made sessions for either individuals or groups of patients. They can regulate the pace of learning and easily test progress made.

Cued-In runs on the BBC B or Master with dual 40 track or 80 track drives and needs an A3 or A4 Concept keyboard for patient sessions. It costs £57 plus £2.50 for postage and packing.

DTP on the A3000

CJE MICROS (0903 213361) has produced a memory expansion board which gives an extra megabyte to the A3000 which makes it ideal for DTP work.

Costing £50 less than the Acorn model, it has an extra facility which can disable it for programs which do not work with 2Mb.

"Because we have set the price at a level which allows for dealer discount, we hope to have this expansion sold via many dealers", said Chris Evans of CJE.

Price of the board is £180.

Easier animation

ACE Computing (0223 462212) has launched Risc OS Mogul, a film-making add-on to its Archimedes 3D graphics package, Euclid.

Designed to take the hard work out of animation by reducting the number of camera positions needed, Mogul calculates all intermediate frames. It costs £20 to all registered users of the £70 Euclid package with free upgrade for current Mogul owners.

Acorn on bright side

ACORN has taken an optimistic stance on its first half-year figures for 1989 which show reduced profit on sales with no interim dividend proposed.

The first six months of 1989 has been described as a period of consolidation and preparation.

Operating profit from product sales to June 30 1989 dropped to £851,000 from a figure of £1.047 million for the same period last year.

General operating profit was boosted to £2.051 million, however, by the timely payment of £1.2 million from Olivetti for an option on marketing rights.

After the inclusion of this exceptional item, net profit following taxation was £2.049 million compared with £711,000 for the same period last year.

Announcing the results, Acorn put emphasis on the product development which has taken place so far this year. There was a 21 per cent growth in the number of mainstream machines shipped, revenue rose from £20.5 million last year to £22.1 million and at June 30 cash balances were £4.9 million.

"These results are encouraging and validate our decision to refocus and consolidate the company's activities", commented Acorn managing director Harvey Coleman.

"Our new products have been well received and allow us the opportunity to grow new markets as well as retain our position in those areas in which we have traditionally done well".

Dixons take the A3000

HIGH Street giant Dixons has put Acorn's new A3000 into 20 of its flagship stores.

Throughout September, the machine became available at Dixons' business centres in Britain's major towns and cities. The decision is being backed by a major promotional and advertising campaign.

Raining? Blame the micros

WHEN thousands of Londoners tune into LBC and Capital Radio each day, the weather forecasts they hear are courtesy of a BBC Master, beavering away at the Luton home of independent meteorologist Philip Eden.

Philip reads eight morning bulletins on LBC, provides six scripts for the rest of the day, ten scripts a day for Capital, text and graphics for the Today newspaper, a weather column for the Sunday Telegraph and also manages to fit in occasional television appearances.

Life is tough for independent weather men who are generally frowned on by the British Met Office and receive scant help.

Micros are a vital ally, and courtesy of LBC, Philip will soon be able to call up reinforcements in the form of three Archimedes. These will be situated in a new mini met office for his personal use at the station's London base.

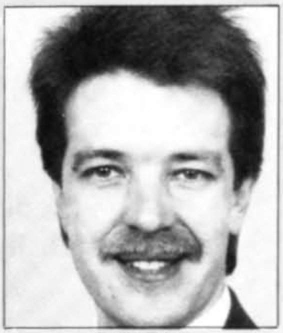
They will join the Master in enabling him to receive direct weather satellite signals and to scour the welter of information beamed to other computers worldwide.

"The greatest advantage of using the Master is that I am able to communicate with other computers", Philip told *The Micro User.* "Because the British Met Office don't like independents and give no co-operation, I have to access the WSI database in the USA to find British weather information.

"We will be equipping the LBC office with two Archimedes 410s and one 440. One will be used as a general purpose machine, much as I use my Master, and the other two will run satellite information for which I use an excellent package developed by Spacetech".

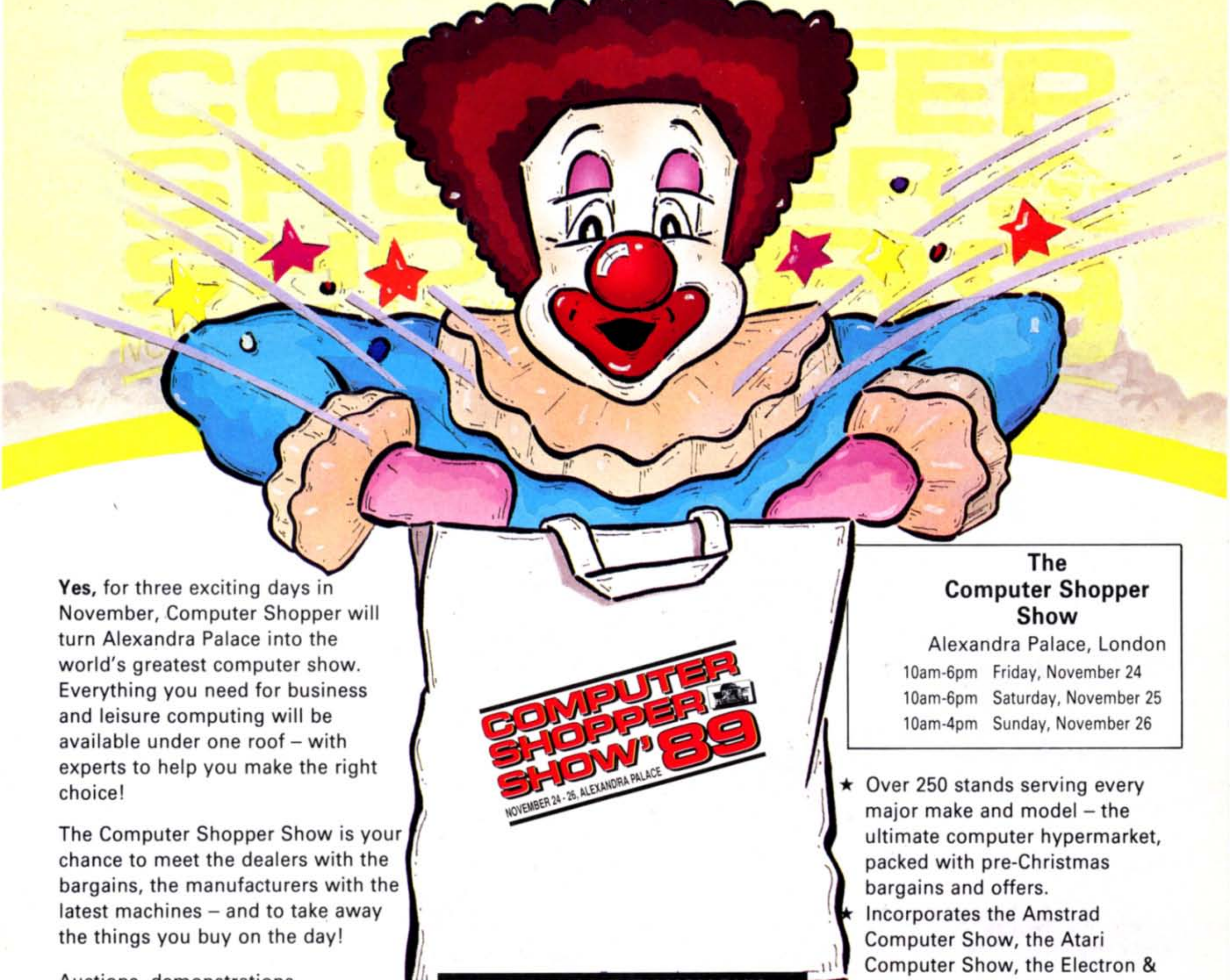
One of the main advantages of using the powerful Archimedes machines will be the ability to achieve very high resolution image processing. Depending on memory, Philip will be able to run up to 60 pictures with a hard disc and without a hard disc will be able to put up a sequence of 18 to 20 images. Added advantages will be the ability to zoom in and add extra colours.

"One of my fortes is weather trivia - collecting interesting facts and figures", he added. "That involves a fair bit of leaf-turning research, and to help my brother has completed the daunting task of producing a database using Interbase. It's a 25 hours a day job which would be impossible without the micros".



Philip Eden

Computer shopping is fun at the Computer Shopper Show!



Yes, for three exciting days in November, Computer Shopper will turn Alexandra Palace into the world's greatest computer show. Everything you need for business and leisure computing will be available under one roof – with experts to help you make the right choice!

The Computer Shopper Show is your chance to meet the dealers with the bargains, the manufacturers with the latest machines – and to take away the things you buy on the day!

Auctions, demonstrations, competitions . . . everything that you've ever wanted from an exhibition will be happening at the Computer Shopper Show – the only show for the direct buyer and the ultimate computer shopping experience!

And, with Computer Shopper you know you'll save money!

Why not start right here! By ordering your tickets in advance you will save £££s! Simply complete and return the coupon with your payment or telephone the Credit Card Hotline on 051-357 2961 to place your order.

Prestel or Microlink
To place your order by Prestel, Key +89, then 614568383. Microlink users should key 72:MAG 001. **Please quote your credit card numbers and your full name and address when you place your order.**

The Computer Shopper Show
Alexandra Palace, London
10am-6pm Friday, November 24
10am-6pm Saturday, November 25
10am-4pm Sunday, November 26

- Over 250 stands serving every major make and model – the ultimate computer hypermarket, packed with pre-Christmas bargains and offers.
- Incorporates the Amstrad Computer Show, the Atari Computer Show, the Electron & BBC Micro User Show and much, much more!
- On-site car parking for hundreds of cars – ideal for taking away your computer bargains on the day!
- Excellent public transport network with courtesy coach link to the local British Rail station.
- Special show features and entertainment to make your shopping experience fun!
- Special discount tickets for under 16s and family groups.

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Yes! Please send me my tickets for the Computer Shopper Show!

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☐ ___ Under 16s tickets at £2 (Save £1!)	______
☐ ___ Family tickets - admits up to 2 adults and 2 children - £9 (Save £5!)	______
TOTAL	______

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Please return your completed order form to -
The Computer Shopper Show Ticket Office, Database Exhibitions Ltd, PO Box 2, Ellesmere Port, South Wirral L65 3EA. A757

TELEPHONE HOTLINE
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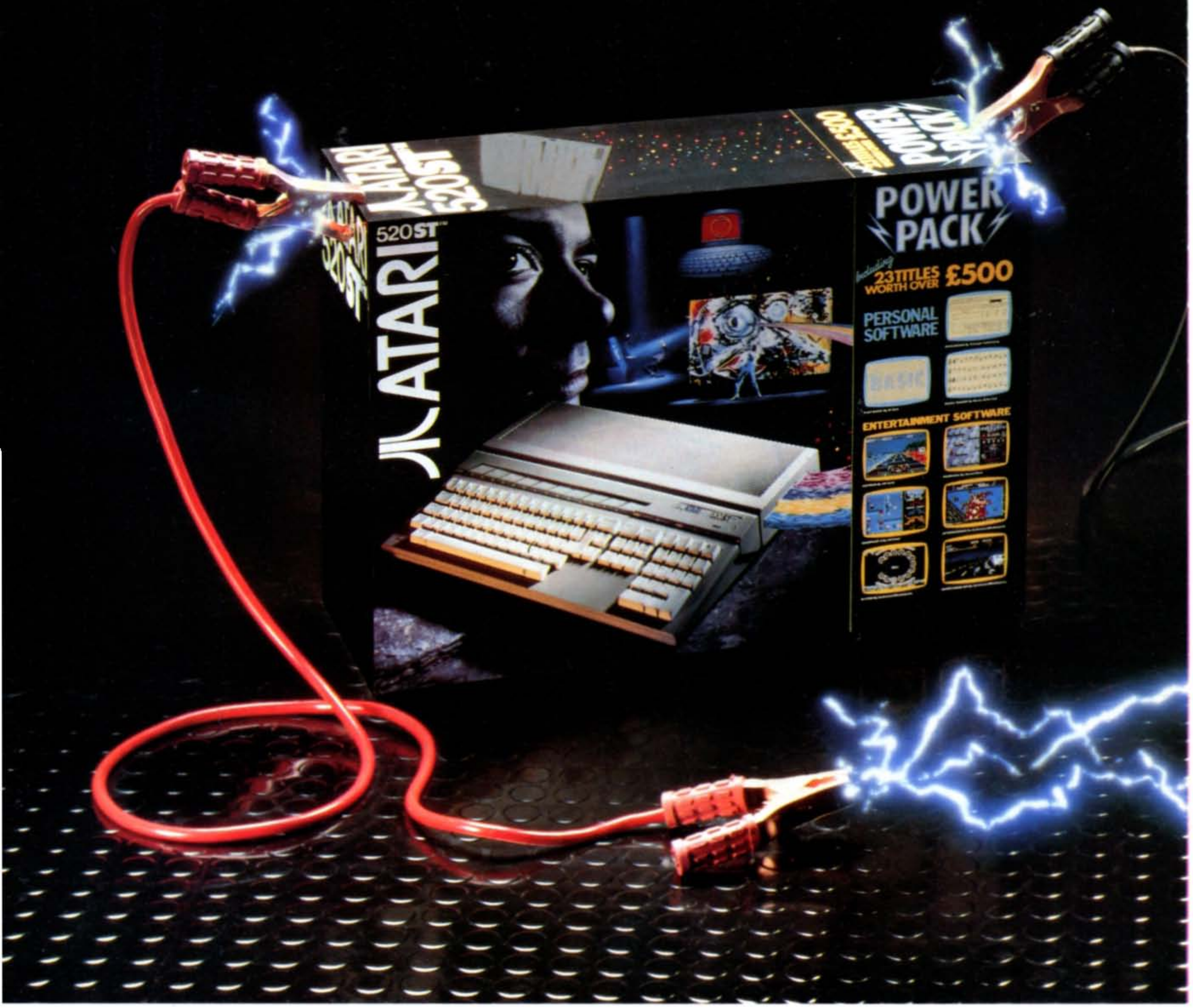
051-357 2961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520ST
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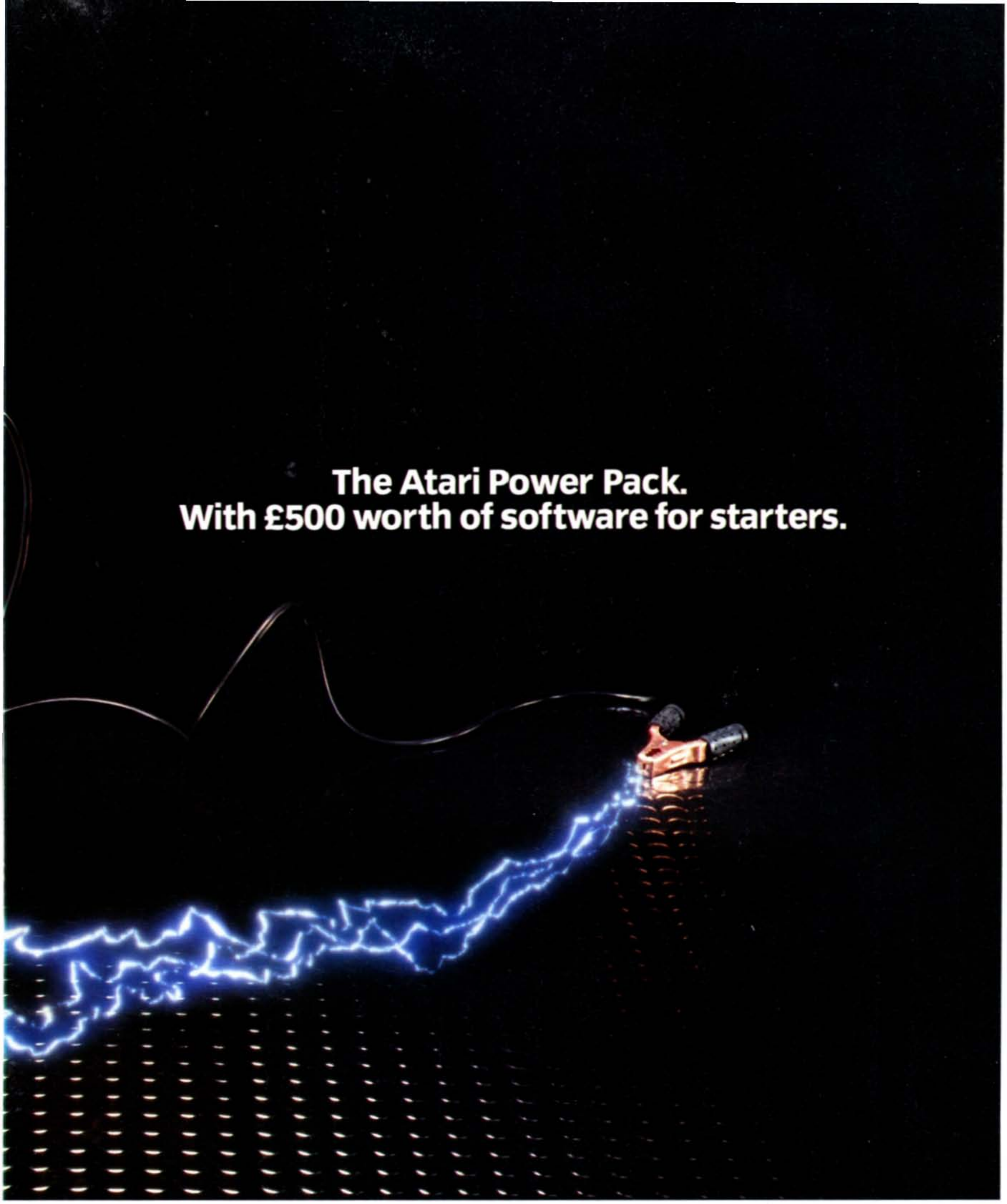
POWER PACK
including 23 TITLES WORTH OVER £500
PERSONAL SOFTWARE
BASIC
ENTERTAINMENT SOFTWARE

There's no catch. We're giving you the Atari 520 STFM and £500 worth of great software titles for just £399.99.

The twenty-three superb titles include some of the greatest games and three excellent programs, which introduce you to the BASIC programming language, computer-created music and the more

Available from: Dixons, Tandy, Comet, Laskys, John Lewis, John Menzies,


The Atari Power Pack.
With £500 worth of software for starters.

popular computer applications such as word processing and spreadsheets.

Be a bright spark, take advantage of this great offer now and pay a visit to your nearest Atari dealer. For further information, fill in the coupon.

Please send me details of this and other Atari products.
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Address:
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ATARI POWER PACK

MU1/NOV

Atari Corp. (UK) Ltd., Atari House, Railway Terrace, Slough, Berks. SL2 5BZ.

Allders, Clydesdale and all good computer shops.

Sounds fantastic

Steve Turnbull explores the fascinating world of audio sampling

Product: Armadeus
Price: £79.95 (with sampler hardware £149.95)
Supplier: Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA
Tel: 0606 48511

ONE of the most promising areas of development on the Archimedes machines is digital signal processing as the sheer power and memory capacity of the machine makes it ideal for handling large quantities of digital information. Up to now this has been confined to video images, but another ideal area is sound, and Armadeus from Clares is a new sound processor that exceeds the specifications of most similar software on 16 bit micros.

What you get is a 72 page manual, one system disc and two more containing samples. The manual has an index, which though concise is fairly useful. Double-clicking the icon in the directory viewer loads the Armadeus application and a !TinyDirs-type directory on to the icon bar. The extra directory contains the samples on the system disc which can be loaded by clicking their icon. Armadeus slots perfectly into the Risc OS environment and is very easy to use.

Once a sample is loaded the waveform is displayed in a window with a series of tools down the left-hand side. These cover play, stop, record, record and display the incoming signal, play while displaying the signal, expand the view of the sample and magnify the view to cover the highlighted area.

While these speed up some operations – which are otherwise only available through the menus – the play and stop options are also accessible through keys f1 and f2, which makes life even easier. The sound output through the internal speaker is satisfactory, but driving a hi-fi via the headphone output is far better – apart from more volume you get much improved bass response.

A second window called Statistics is needed for full control of the sample and you can pop this up with f6 or via the menus. This gives details of the size, sample speed, replay speed and duration. In addition it has a number of buttons to control the internal speaker, play only the marked area, keep repeating the sample when played or use a pseudo-stereo effect – Armadeus is mono in operation.

Slightly unusually there are also areas to drag other samples in order to load, overlay, insert or append them. This is a little non-standard as far as the Risc OS is concerned, but works well enough and you can even load a sample from an Atari ST disc using the utility provided. A final set of radio buttons – the type where only one can be selected at a time – specify the sample type when you load it: The Archimedes series use linear signed, the ST has linear unsigned while a third type is logarithmic. The buttons must be set before you load a new one.

The manual has a short but satisfactory tutorial section which takes you through the basic operations of the sampler. Most fun can be had in the processing menu. Here you can reverse all or part of the sample, add echo, fade in and out, amplify the volume in two ways, initiate a high or low pass filter or clear the memory. I used this so much I felt it was positioned too far down its parent menu in relation to other less-used options.

To take a sample you need the necessary hardware – the ones currently supported are shown in the adjoining table – and a sound source. The simplest is a tape recorder and most have the advantage of a built-in microphone. The software automatically configures to the hardware you have except that it can't distinguish between the Armadillo A448 and A448b boards, so you have to select these individually.

As Armadeus only works in mono you can choose which channel a sample is taken from on the more advanced hardware. Once your hardware is set up all you need do is click the appropriate icon or menu option. A dialogue window is presented which gives the sample rate and duration – you can either continue or cancel. It was here I ran into my first problem. When I clicked OK the machine appeared to hang up. I tried it three times and the same thing happened, but on the fourth attempt I left it alone and after about 20 seconds it started working again – it had taken the sample.

On re-reading the manual I noted it does mention that some interrupts are disabled, however it is actually extremely unnerving to see a stopped hourglass – perhaps a more forceful hint would have been in order. All the samples you take can be manipulated in exactly the same way as the ones provided.

Another interesting edit facility is that you can modify the waveform by hand. By switching a toggle in the Miscellaneous menu you can draw a waveform directly on the screen. This is not particularly useful, as any reasonable waveform is very complex, however you can use it to smooth out some sounds to reduce their intensity – perhaps an unwanted click where you've appended a sound.

Although not of great use in the home the Print facility will be a tremendous boon in schools and colleges – using any standard Risc OS printer driver you can output all or part of a waveform.

Experimentation now began in earnest. The quality of a sample is determined by the sample rate – in other words, the more samples you take the more accurate the result. The machine defaults to a rate of about 20kHz which, using a 500k buffer, gives 24 seconds of sampling time. However reducing the rate to 4kHz does not appreciably reduce the quality – at least not on my equipment – and increases the time to just over 120 seconds.

The advantage of this if you are preparing sound samples for a game is that you can obtain reasonable effects without occupying a massive amount of space. To facilitate this Armadeus provides a *Save as module* option which puts the current sample into a relocatable module which you can load and then assign to a sound channel as normal.

This is ideal for music applications since you can sample basic instrument sounds and then play them back using SOUND commands rather than trying to digitise a complete piece.

But Armadeus doesn't just stop at simple manipulation of a sound sample: There is also the concept of a *song*. You can define start and end points within the sample give the marked area a name, specify a number of repeats and any alteration in pitch. You can then build up a whole series of these loops and play them back, thus making the overall sound longer than the original sample. The disc contains an example based on the James Whale show theme tune Bimbo.

It takes quite a bit of work putting one of these together and is best with a highly rhythmic piece, but the result can be very effective. You can also put a song into a module, so a simple VDU7 command could result in several minutes of music.

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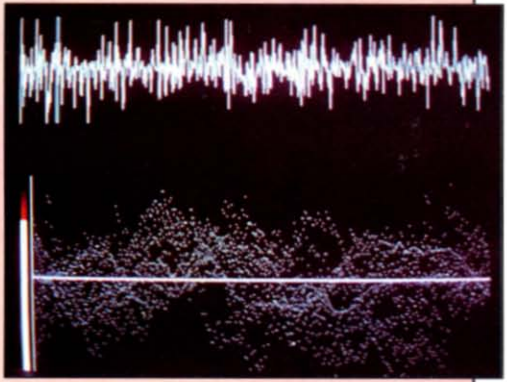
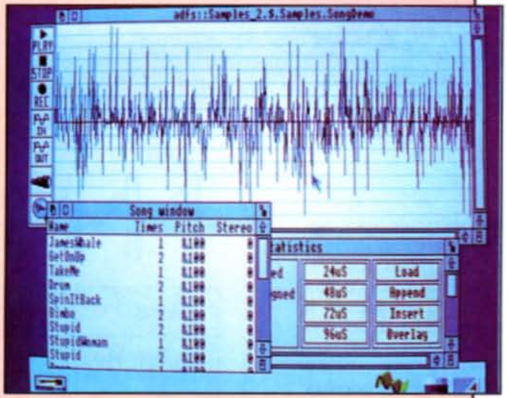
Wild Vision 1208



Viewing waveform displays



Name	Times	Pitch	Stereo
JamesWhale	1	0.100	0
GetOnUp	2	0.100	0
TakeMe	1	0.100	0
Drum	2	0.100	0
SpinItBack	1	0.100	0
Bimbo	2	0.100	0
Stupid	2	0.100	0
StupidWoman	1	0.100	0
Stupid	2	0.100	0

Armadeus editing samples

Summing up

I found Armadeus simple to use and very effective. There was one non-fatal bug when the whole sample was saved although I only wanted a marked section. If you need sampling software Armadeus should be top of your list.

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BBC Micro/Electron	2239		2242		2245	
BBC B+/Master 40T		2240		2243		2249
BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
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Setting the style

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Bruce Goatly looks more closely at Acorn's Desktop Publisher

ACORN's new Desktop Publishing software, which we looked at last month, can achieve professional-looking results. Let's see how to go about it. Starting up the program requires some patience because of the various elements that need to be installed separately. On a 1Mb machine, where memory is really tight, you will also need to reallocate memory with the Task Manager to avoid running out later, as the DTP program itself uses 600k.

Owners with a hard disc have an advantage here as the whole application can be located in a single directory.

Acorn DTP treats each document as a sequence of pages: The first step is to establish the page format which can be specified with great precision or you can choose from preset options.

Next you design a master page – if you need one – and set up a style sheet, which gives an overall consistency of style to the document, although each page's layout is independently adjustable.

Designing a master page is quite complicated and time-consuming even though there are rulers and column guides to help you. In fact it's worth spending some time with pencil and paper before sitting down at the micro.

You can define separate master pages if you want left and right pages to be different – as they are, for instance, in *The Micro User* – with different headers and footers. The style sheet, which also contains the paragraph style definitions, can be saved separately from the document so you can produce a series of documents all to the same style.

It is best to prepare any large amounts of text on your word processor: It is easily imported into the document, at which point it becomes a story and the file name is shown on the browser on the control panel. If the story is too long for one frame you select the next and click on the story name in the browser.

Text does not flow from one frame to another automatically at this stage, so importing a long story can be rather tedious because of the need to click repetitively on a frame then the browser, interspersed with selecting a new page. Once loaded, however, the whole text of a story is stored as a unit and will flow back to replace any gaps you make.

All imported text is normally given the default style of Body text but a very useful feature of Acorn DTP is the ability to recognise paragraph styles – tags – in imported text if they are put between angle brackets at the start of a new paragraph, like this:

```
<subhead> Cheese
```

Any unrecognised tags are added to the browser and the style is defined as the same as Body text.

This means you can effectively design your publication while you are typing in on your word processor and leave it until the DTP stage to decide the final interpretation of the tags.

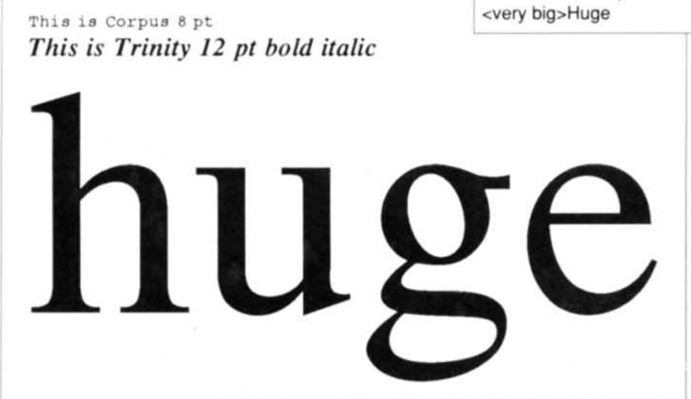
Figure I shows that tagging can even extend to font changes as long as appropriate styles are set up. The largest font size available with this software is 254 pt.

The fonts used in Acorn DTP are worth a special mention. In DTP packages on the 8 bit BBC Micros the fonts are stored as bit images – patterns of dots – which gives them a distinctly ragged appearance on enlargement.

In contrast, Acorn DTP stores the fonts on disc as outlines for each letter and uses these to

Turn to Page 24 ▶

<corpus>This is Corpus 8pt
<italic>This is 12pt bold italic
<very big>Huge



This is Corpus 8 pt

This is Trinity 12 pt bold italic

huge

Figure I: Changing fonts by tags in the story

◀ From Page 23

calculate the bit patterns for each size when called for – storing as many as it can in a font cache in memory. The bigger you can make the font cache the less often the patterns have to be recalculated from the outlines on disc and the faster a page will be redrawn.

A really impressive feature is the use of two special techniques to improve the appearance of the fonts. One is anti-aliasing, which is a clever way of improving the clarity and legibility of text on screen. The other is hinting, which makes fine adjustments to the bit patterns to avoid distortion at small letter sizes.

A refinement of anti-aliasing – described as *sub-pixel anti-aliasing* – can be used to increase the improvement available but the cost is extra memory used and a loss of speed.

Extra characters can be accessed by using Ascii values over 127 and this allows you to print accented letters, joined letters – diphthongs – and a range of symbols, as Figure II shows. They are called up by holding down the Alt key while typing the Ascii number on the numerical keypad. This facility also exists – undocumented – in the !Edit program, so such characters can be typed there in your text and imported direct.

Automatic hyphenation can be used, which lets the program make decisions on splitting words at line ends. This tends to reduce the open space in lines and gives the text a more professional appearance.

An exception dictionary is provided to let you add words not to be split, or to specify where hyphens should fall. Alternatively you can add a soft hyphen in the text to force a word to break at a certain place if necessary.

Ægean flying fish

¿Habla Usted Español, Señor?

†Ça y est: © Acorn 1989

Figure II: Some odd characters

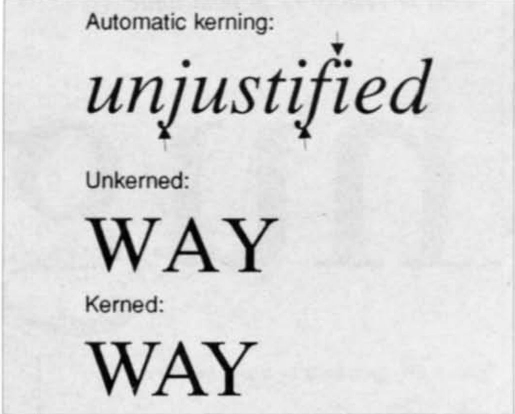


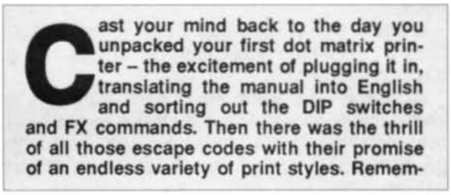
Figure III: Kerning in action

Fixed spaces can be inserted into the text to stop items from being split over a line break or to prevent adjustment of a space during justification. This is useful for things like telephone numbers or initials and names.

One of the niceties of proper printing is to use kerning to improve the appearance of the text – especially of titles in large capitals – by reducing the space between letters. Some kerning is done automatically, as around the italic letters *f* and *j* but you can also adjust the kerning of pairs of letters manually to achieve the most pleasing effect. Figure III shows examples of automatic and manual kerning.

Once you are familiar with the facilities on offer you can incorporate quite sophisticated design features, such as the dropped capital letter shown in Figure IV. This involved three frames – one for the capital C, one to repel the text around the capital and one for the rest of the text – and took only a few minutes to set up.

For all the power of the program, printing the document can be where the fun begins on a 1Mb machine because there are conflicting demands for the limited free memory remaining – about 88k. At least 40k, but sometimes considerably more, is needed to buffer the printing, which leaves at most 48k for the font cache.



Cast your mind back to the day you unpacked your first dot matrix printer – the excitement of plugging it in, translating the manual into English and sorting out the DIP switches and FX commands. Then there was the thrill of all those escape codes with their promise of an endless variety of print styles. Remem-

Figure IV: A dropped capital letter

On a complicated page this may not be enough for decent speed and sometimes the only remedy is to change from Mode 12 to a less memory-hungry one such as Mode 11 or, in extreme cases, Mode 0. Another memory constraint is the use of sprites – on a 1Mb machine you are advised to keep them to a minimum.

A typical A4 page may take 10 minutes to produce with a 9 pin printer, but this is not too surprising given that it is being done in quadruple density graphics mode with three passes for each line. It does, of course, suggest that you should check everything on screen before printing, but the wait is worth while because the quality of the finished product is outstanding.

Naturally the quality is improved if you have access to a better printer such as a 24 pin or – for the ultimate – a laser printer. For a comparison take a look at Figure V.

Acorn DTP has as a whole relatively few weaknesses. It is fiddly to align text lines in adjacent columns if there is, say, a heading in one but not the other. And the edges of italic letters such as *f* and *j* are sometimes cut off at the edge of a frame because of automatic kerning. This can be overcome, but needs attention. The printing is not multitasking, which means that the

Turn to Page 27 ▶

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A way through the jargon jungle

Cacheing: Setting aside a portion of memory to store font information to avoid constant disc access, thus speeding up page drawing.

Document: A file on disc containing pages in DTP format.

Justification: The process of enlarging spaces between words and letters to make the right and left margins line up.

Kerning: Moving letters closer to make them fit together more evenly.

Page format: Defines the size and orientation of the page, and whether left and right pages are the same or different.

Paragraph style: A group of attributes – type face and style, justification, indention, spacing, tab stops, hyphenation, letter spacing – applying to a whole paragraph.

Points: A unit of type size equal to 1/72 inch, abbreviated to *pt*.

Story: A piece of text imported into the DTP program.

Style sheet: A file on disc containing the page format, paragraph styles and master page for a whole document.

◄ ***From Page 24***

machine is tied up while you print your document.

The strengths of the package are substantial, many deriving from the fact that it runs on a really fast micro with a state of the art operating system. For instance, because Risc OS provides the windowing facilities, all file handling and transfer operations will already be intuitive to Archimedes users.

A useful extension of the windowing concept allows a window to be moved partly off the screen to give more room to work in or just to see what is behind. Some of the applications provided, such as the printer drivers, can be used by other Risc OS applications.

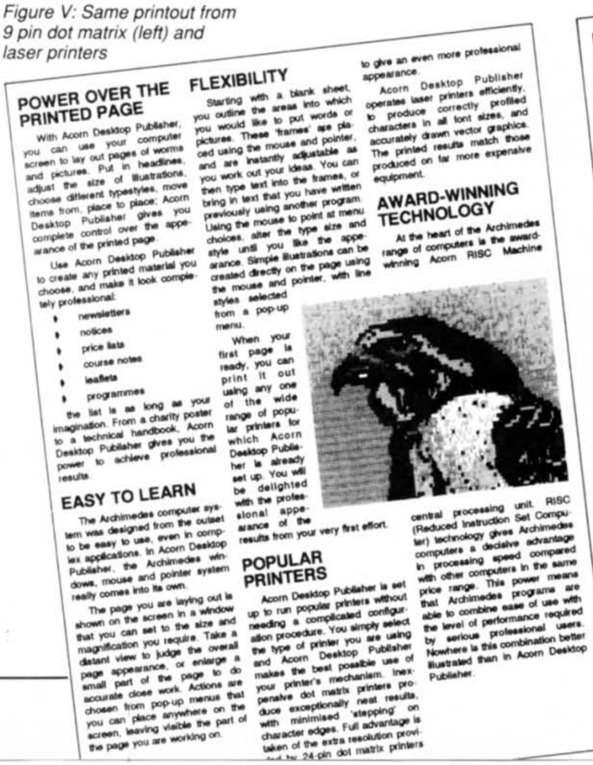
With 2Mb of memory or more the multitasking nature of Risc OS means that other applications such as Edit, Draw or Paint can be run simultaneously, greatly increasing the potential of both machine and software. Plus you can have a really big font cache as well as the needed printer driver workspace.

The program obviously does not have all the facilities of a fully professional DTP program such as Ventura or Pagemaker 3 – which run on the likes of IBM PCs or the Apple Macintosh (hard disc only). But it has the feel of one and is only a quarter of the price which makes it extremely good value.

Summing up

For anyone with an Archimedes who wants to do page design work, whether in a personal or business capacity, this program is a landmark. It provides most of the features found in much more expensive professional programs, with the added advantages of the speed and friendliness of Risc OS. It could even give the Archimedes itself the boost it needs in the medium-sized publisher market and deserves to do well.

Figure V: Same printout from 9 pin dot matrix (left) and laser printers



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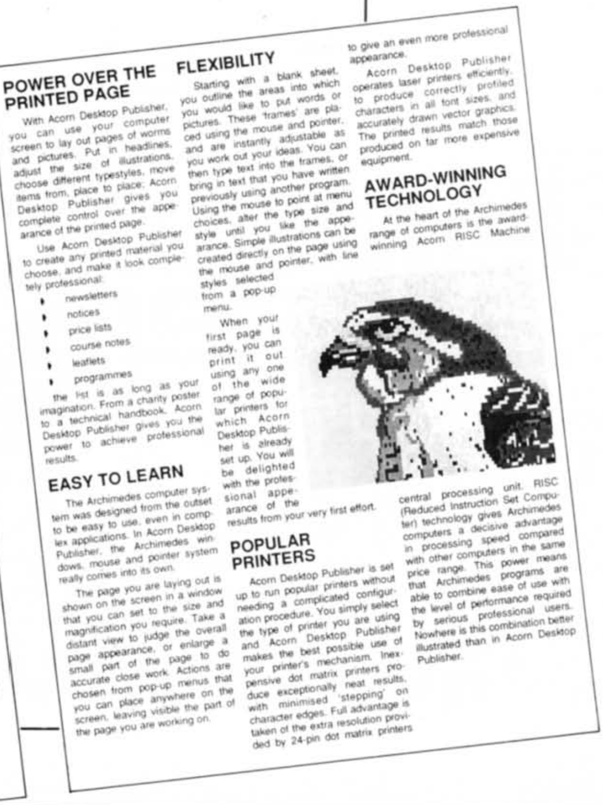

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Try to get out of that

Some pedantic maze solutions from the Mad Hatter

A RECENT letter made me realise that while I have been conducting a tutorial tour for beginners to adventuring via the delights of *Lords of Time* – concluded this month – I have not given any real instruction on dealing with mazes, since they don't present major problems in that particular adventure. So let's fill in that gap now.

The general reaction of a novice when faced with a maze is blind rage coupled with entering random directions as fast as the keyboard will take them. Now there are two problems with this approach: Firstly, it doesn't do the blood pressure a lot of good, and secondly, hammering the keyboard is a pastime for arcade addicts – not cerebral types like you and me. So, make a cup of tea – don't dunk the dormouse – and pay attention to your aged friend and mentor.

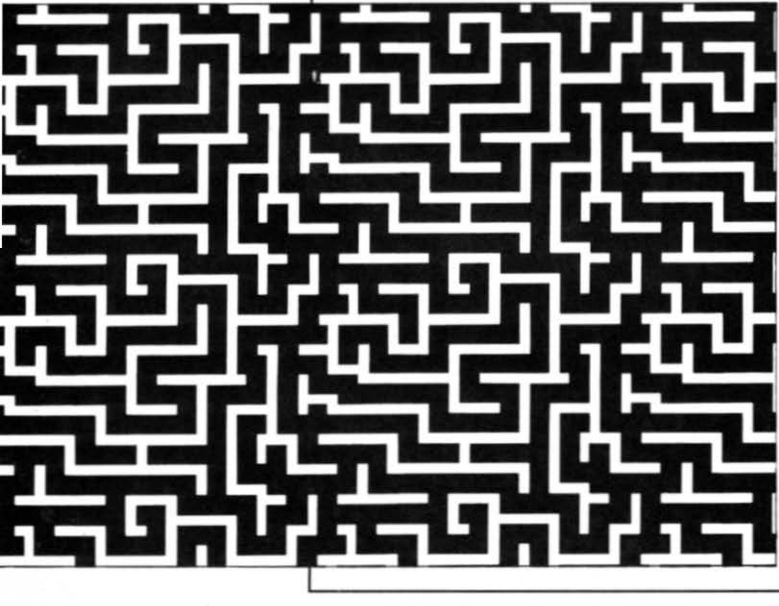
There are three basic types of maze to be considered before we even think of the kind of nasty twists that are inflicted upon us these days by the likes of the Cambridge Mob.

Type one is description-dependent, type two is exit-dependent and type three is inventory-dependent and we are going to look at the techniques for tackling each in turn.

One general tip should be noted for any type: The moment you realise you are in one – hopefully at the first location – stop. Now write down *exactly* what the location description has to say, since this will indicate the type of maze you have encountered. Next, move in the opposite direction to that by which you entered: If a move North got you into it go South – and so on.

Hopefully this will land you back outside and you can now take a few moments to gather your thoughts: Check your possessions and plan the assault. The three types of maze I am going to describe will always succumb to a methodical attack – as will nearly every type, for that matter, although there is an exception to this rule in the recently released Topologika adventure **Avon.**

The locations in a description-dependent maze will have the following kind of text: *You are in a maze of twisty turny little passages, all looking the same.* You may be told that exits lie in all directions as well, but that is unimportant.



The aim you have to adopt is that of progressing logically and relentlessly step by step, constantly retracing your moves until you are always sure of your exact location. So, having just entered you should always move North *unless* that is the move you know takes you back out.

Having moved North, note the exact wording of the location description: If it is identical to the one you noted at first you have not moved. Check this by testing the known direction of the exit.

Next, move Northeast – and again check the description. Let's suppose this time it reads *You are in a maze of twisty, turny little passages, all looking the same.* This is one of the more obscure variants beloved of the nastier type of programmer who delights in foxing the unobservant. Note the extra comma that has been inserted: This time you *have* moved. Check by reversing your direction – enter SW – and once again carefully note the location description.

Hopefully, but not inevitably, you'll be back at the first location – double-check by testing for the exit and then return to location one of the maze. You can now add the second to your map but don't rush there yet. First you must test every possible exit from location one, running through all the eight main compass directions, together with up and down.

Each time you have genuinely moved there will be a subtle difference in the way the location is described – a comma or two added or removed, the words *twisty, turny* and *little* will be juxtaposed so that on one occasion the description will be *turny, twisty little passages* and another time it will be *twisty little turny passages* and so on.

You can see now why the bash-a-key-and-see-what-happens approach will get you nowhere. The logical approach forces the maze to give up its secrets – and its treasure – eventually and will then enable you to romp through it at will on future occasions.

Next time, I'll deal with the other two types of maze. Until then, don't get lost!

Back to the Future

The climax of **Lords of Time** is rapidly approaching as we enter the Future time zone. Make sure you are wearing the gauntlet and that you are carrying the coin that the tooth fairy gave you in the Contemporary Era.

Go to the top of the Milky Way and get the white hot star which you must now take to the floating metal platform so that you can enter the starship. Once inside go to the swimming pool to cool the star and collect the emerald. After that get the mattress and grapple, then go to the walkway junction with exits N,E,S and W.

Move West from here to the Bureau de Change and give the android the silver coin in exchange for the groat. Now proceed to the edge of the crater and throw the mattress so that you can go down safely. Once you are outside the sports arena you need the groat to gain admission. Get the light sabre from the alcove room and then you can deal with the cyberman.

Go South from the long room and then West to the roofless room containing the glass phial. Fire the grapple and you emerge outside the sports arena again.

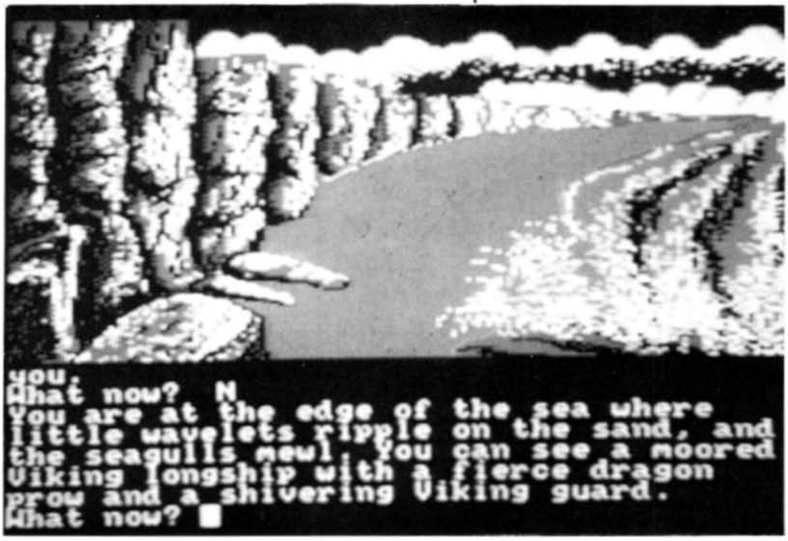
Next, get the screwdriver from the robot repair shop and open the cyberman to get the silicon chip. After that, recover the mattress, go beside the deep tropical pool and throw it once more so that you can go down to the dingy hole and collect the ruby. Down once more takes you back to the clock.

In the Roman Era, make sure you have the drinking horn before you go anywhere and after that proceed to the deserted treasury and take the buckle. This has to be stolen from you before you can enter the arena, so don't fret when you are mugged.

After that, go to the barracks and get the trident and net from the locker, then visit the temple and render due devotion to obtain the sandals. Now you can enter the arena and deal with the lion: Throw the net and then the trident to immobilise the lion, take the buckle and leave.

Go to the marble basin full of water, drink the water of strength which was in your horn and refill it. You are now strong enough to pull the grate in the hot baths and so enter the hypocaust. I'll leave you to map this six-location maze, so SAVE before you enter and be prepared to slake your thirst. Somewhere in the hypocaust is the way back to the clock.

You are now ready to confront the evil Lords of Time. Enter the ninth time zone and drop the milestone before the arch – abandon hope, in other words.



```
you.
What now? N
You are at the edge of the sea where
little wavelets ripple on the sand, and
the seagulls mewl. You can see a moored
Viking longship with a fierce dragon
prow and a shivering Viking guard.
What now? █
```

Find the experimental laboratories and set the animals and people free – you will be rewarded with a box but *don't* open it. Now go to the putrescent chamber and dig with the shovel to free the bottle so that you can deal with the enormous flower.

Inside the flower, go to the very bottom where the tangled roots are and drop the bottle. This kills it, so you can move east and so make your way to the trapdoor.

Wear the filmy cloak you find there and move up so that you are under the Time Lords' table. Move up again so that you are standing behind them and go east. Here you are lost in the mists of time and can see the cauldron. Provided you have remembered to bring the nine marked items with you – olive branch, buckle, jester's cap, silicon chip, box, teardrop, tusk, wing and egg – you have only to throw them into the cauldron to win.

Did I hear you say this is the first you've heard of a jester's cap? Quite right. I don't believe in spoon feeding you. The jester and his cap can be found by doing the appropriate things in the country house – time zone six.

❛ The aim you have to adopt is that of progressing logically and relentlessly step by step ❜

Vengeful journey

The next part of **Programmer's Revenge** that we are going to explore is one right up my street for reasons that will be obvious to all who have read Lewis Carrol. On leaving the house via the front door you move N, E and S to the signpost picture and then SW to the croquet lawn. What memories that location brings back – I once won a doubles tournament at college with a chap who was later made a bishop by way of compensation for having to partner me.

Before doing anything else, you must make preparations for undertaking a successful act of petty larceny. Proceed east to the courthouse, NE and open the door of the prison cell. Now go back to the croquet lawn.

Go South and take the pole, then South again into the ugly building and throw the pepper at the duchess. Look, then take the doll before moving N and W where you should ignore the warning and take the tarts.

Since you opened the cell door you can now

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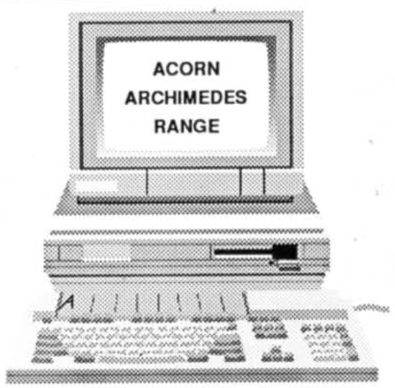

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◄ *From Page 29*

return without trouble to the signpost picture and from there twice NW to the driveway. Go to the trophy room and leave the tarts for 10 points and the doll for eight. Go to the hall and drop the key before tackling the next section – the school and cricket pitch areas.

Move three times North to the crossroads and then E, NE into the school playground, after which you should go N, N into the classroom. There's a sum on the blackboard – and the answer is 43. If you now proceed S, W, N into the headmaster's study and say 43 the safe door will open, enabling you to look and then take the money.

Now go S, W, S and NE to reach the football field, then N and SE to play cricket. The apple turns out to be a cricket ball, so throw it and you can then move east to locate the urn. The required input here is – of course – TAKE ASHES. If you go NE, SE and S you are back at the signpost and from here you should travel NW, NW and N to the crossroads ready for the next bit of action.

From the crossroads move N and SE into the valley where you'll find a horn which you'll have to blow later on to reach the endgame of this adventure. Now go SE, NE, SW and N to the canyon and you can cross the tightrope safely as long as you are carrying the pole.

Three moves east get you across and then you should go NE and S and take the stone on the mountain ledge. Now go north and throw the stone at the cairn: Look and a medallion will be revealed. Take it. Next move SW and make your way back across the canyon, after which SW, NE, W, SW, S, S and S will bring you back to the hall. Leave the pole and the horn here and take the money, urn and medallion to the Trophy Room for a total of 23 points

To be continued...

Hatter's Helpline

Scott Walkinshaw has a comment about Graham Couve's inquiry on a game called **Empire**. He writes: "I have a copy which I got on a wargame package produced by Prism Leisure. However it is slightly inferior to other versions I have seen on other types of micro".

Can I remind frustrated readers that there was a slight error in the **Elite** Commander Display program published in the March column: A missing set of quotation marks was the culprit in line 250. It should have read:

```
250 PROCoscli("LOAD "+f$+" "+STR$~b%).
```

Correcting this line will remove the irritating message *Missing " at line 720.*

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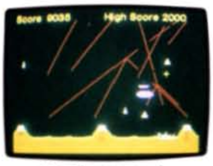

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SOFTWARE SCENE

UIM ... plumbing the depths

Price: £19.95 (5.25in) £21.95 (3.5in Compact)
Supplier: The Fourth Dimension, P.O. Box 4444, Sheffield.
Tel: 0742 700661
Requirements: Model B and B+ with 16k sideways ram.
Master or Compact.

IT has finally happened – and it only took four years. A rival to Elite, possibly the most successful game ever released for the BBC Micro, has arrived. Although comparisons are inevitable let's take a look at UIM in isolation first.

The name stands for Ultra-Intelligent Machine, which is the basis of the rather thin plot line: It is the not-too-distant future when the greenhouse effect has caused the icecap to melt raising the sea level and humanity has taken to the water.

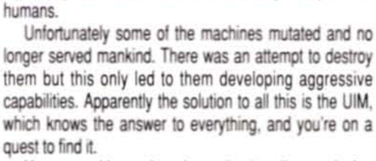
In the depths of the ocean there are lots of ports held together in loose groups called networks – there are 256 ports in each of the 256 networks. However, things are not quite that simple – are they ever? Back in the early days of oceanic settlement some scientists designed self-replicating machines which were able to go deeper than humans.

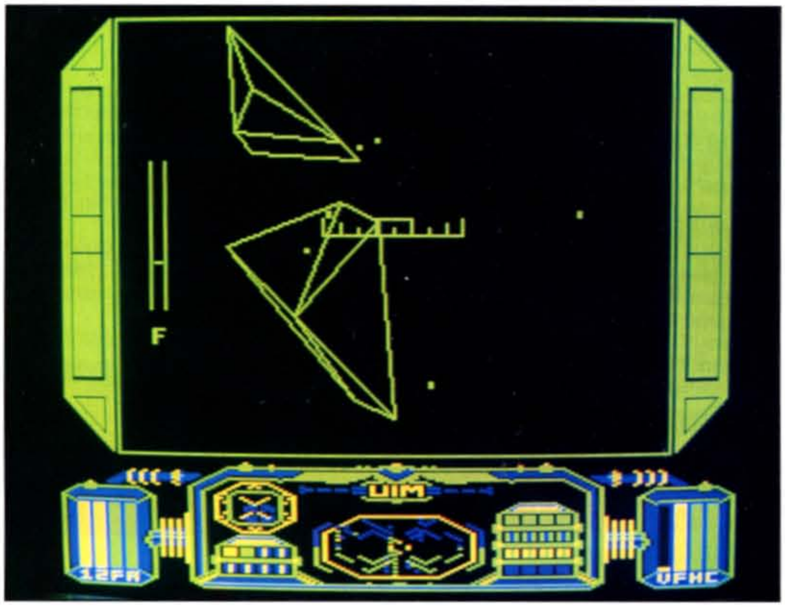
Unfortunately some of the machines mutated and no longer served mankind. There was an attempt to destroy them but this only led to them developing aggressive capabilities. Apparently the solution to all this is the UIM, which knows the answer to everything, and you're on a quest to find it.

You start with a submarine – they're all named after butterflies – equipped with lowest power weapon (called a *generator*), three out of four missiles, a flare, a sea mine, a low grade set of shields and N$400 (Network dollars).

By buying and selling on the commodities market you build up your cash reserves and can buy more equipment to help you survive. The ship has a cargo limit of 32 tonnes but you can carry up to eight of any one type and a maximum of four types. There's a towable cargo pod which increases the capacity.

Travel between ports is interesting: After leaving one you hit H and are launched on a sub-orbital trajectory into the atmosphere. You have to keep the ship on track using the control keys otherwise your heat shield disintegrates. You can buy another, but preserving it saves money.





There is a re-entry software module but I found it very inefficient.

Once back in the water you head for the port's marker buoy at top speed. It is very unwise to engage in combat early in the game as the pirates will make fish meal of you. Once you're close enough to the buoy you are docked automatically.

The viewscreen gives a you a vector graphics display and below it is the short range radar which shows the positions of craft relative to you.

Later essential purchases include a central computer which allows you to load various helpful programs – the re-entry module is one. In fact many useful options like the navigational aids won't work at all until you've got the necessary software.

Once you've made a reasonable amount of money you can start buying and selling on the stock market and currency exchanges. This is just the same as commodity dealing except that prices can fluctuate more. Although you can check to see how many shares and what currencies you have there's no record of what price you bought at so it's important to keep track to ensure you sell at a profit.

The variety of equipment you can get is quite amazing – 32 items in all. And these are just the standard types: It's possible to acquire other items which are not listed in the manual by carrying out the missions.

Perhaps the most vital item to buy is the missions module. Before you can leave one network and enter the next you must complete a mission and find out what you need to do: You have to have the module. The things you get to do are usually of the fetch and carry variety – go to such and such port, pick up some medical drugs and take them to another place. Rewards can be money, equipment or occasionally nothing at all. But on completion you always get moved to the next network.

UIM and Elite are similar in many ways. Fourth Dimension rightly claims flickerless graphics and there's also no exclusive-oring, which is certainly a neat trick. However, overall control is coarser.

Combat is much the same, although you've got more ways of attacking and defending, and trading progresses in the same way. You don't have the difficult docking which put off so many would-be Elitists but there is the re-entry procedure which requires your complete attention.

Trading is again the same: You have to find two ports which have different product prices and move commodities between them. Here the eight tonnes per type of cargo restrictions are more limiting than with Elite, but the game framework makes this less of a problem.

Since the similarity is so strong the true test is this: Will I keep playing it the way I've played Elite for years? And the answer is yes.

Submariner Lazarus

Sound	*9*
Graphics	*10*
Playability	*10*
Value for money.	*10*
Overall	*10*

Play it again, Sam 11 ... but not too loudly

Price: £9.95 (tape), £11.95 (5.25in), £14.95 (3.5in)
Supplier: Superior Software, 3 Manor Drive, Scawby,
Brigg, S. Humberside DN20 9AX.
Tel: 0652 58585

HEY ho, what it is to wake up in the morning and find a package on your doorstep promising hidden delights. Well, one can dream in fact it was Play it Again, Sam 11. I stifled a yawn and hauled myself over to the micro waiting patiently in the corner.

First the oldies: **Pipeline.** Now here's a really good game, almost a classic – it got straight 10s when first released. Fast arcade action, puzzles and the speed of the scrolling as you whizz down the pipes... amazing stuff. The graphics are good, reminiscent of Ravenskull, while the sound is adequate. Game play is taxing but fun.

Then there's **Barbarian**: This was never quite what was expected of it. The graphics are well-detailed, again the sound passes as adequate and there are plenty of fighting options. Unfortunately the gameplay is a bit boring, the number of backdrops is limited and there's little real variation – it's not a patch on Barbarian II.

Monsters is a real rave from the grave – did I say rave? It must be one of the first ladders and levels games where your little stick man runs around a very simple screen pursued by ever increasing numbers of monsters. By way of defence you can dig holes in the levels which the monsters fall into – at which point they hang rather pitifully by their antennae. Then you fill in the hole and the poor things fall through for 100 points.

If you fail to fill the hole the nasty manages to pull itself out – nice bit of animation – and comes after you with undiminished intent. On higher levels any monsters that escape a hole turn into an even nastier green type. You won't like them when they're angry. Monsters is fun, but the graphics show its age.

The final offering on PIAS 11 is the previously unreleased **Baron**. Your dad, the king, has heard that his best friend, the wizard, has been kidnapped by the evil baron and has gone off with an army to get him back. You, the prince, have taken a short cut and sneaked into the baron's castle to rescue the wizard yourself. Ah, impetuous youth.

This is the scenario for a rather poor Citadel clone. You wander round from screen to screen, climbing ladders jumping nasty monsters and generally having a good time of it.

You get the usual energy-draining obstacles which force you back to your entry position. Things which go up and down, things which go backwards and forwards and nasty guards that follow you. Unlike Citadel you are equipped with laser beam eyes (well that's what it looks like) with which you can zap the guards. Apparently you have to hit them in the face, but I just couldn't time it right – they're taller than you so you have to do it while jumping.

There are objects to collect which help you accomplish your task. But I'm not qualified to comment on this as I couldn't get past the guards.

The graphics are pretty poor, exclusive-oring in these days of real sprites is a real throwback and the sound is just about on the level you'd expect.

In this package only Pipeline really stands out. If you're a real arcade-adventure nut you can buy it for Baron, but that's about it.

Geof Brown

	7
Sound	7
Graphics	8
Playability	6
Value for money	7
Overall	

Spooksville ... really scarey

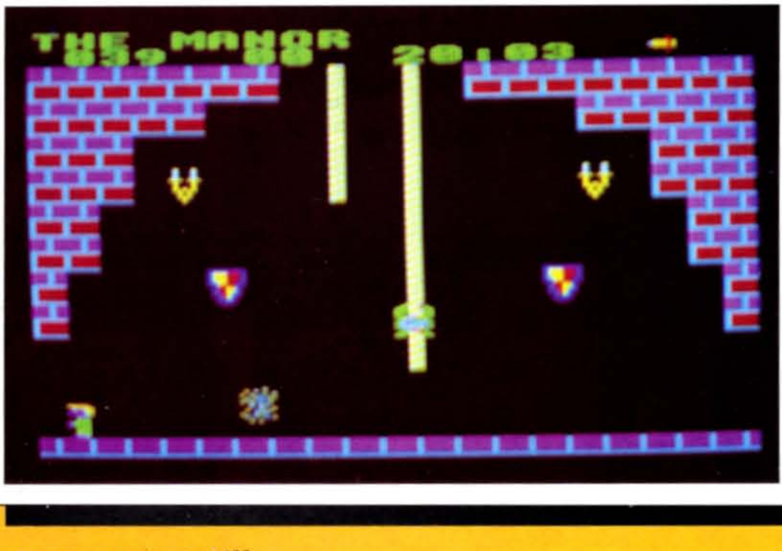
Price: £2.99 (tape)
Supplier: Blue Ribbon Software, CDS House, Becket
Road, Doncaster DN1 4AD.
Tel: 0302 321134

SPOOKSVILLE has you playing the part of Gaston the Intrepid, bent on finding a Spellbook which has lain deep in the darkness for many centuries.

Now this is not a very nice place and all sorts of nasties will try to thwart your mission. The opposition includes Frankenstein – I suppose they mean his monster – and Dracula. This is the scenario for another arcade adventure game in the style of that old favourite Citadel. The graphics and sound are also closely based on the older game.

Gaston can travel left and right as well as up and down ropes and ladders. Objects can be found to help solve the game – the stake will kill Dracula and the barrel will enable Gaston to escape from Frankenstein's lair.

There is no need to guess at these things, since a fairly comprehensive *What to do* list is given in the instructions. Essential to success are the ring – hidden in the crypt – and the scroll. The latter is one of the few items whose location and purpose is not revealed before you start.



Old time Citadel players will remember the ghostly cloaked figures which needed a magic spell fired between the eyes to remove them from screen. Spooksville has similar figures in abundance. In fact, there is one in every room except the starting screen and all need to be shot.

The strange thing about your weapon is that it only works if you are moving when you fire it. Also its range is so limited that it is "wait till you see the whites of their eyes" time.

Tall monsters can't be destroyed by the standard technique – it is essential to find the correct object to deactivate them.

The sound of your heartbeat can be heard as you journey – shades of Spycat – and other noises are made for jumping, firing and colliding with nasties. All sounds can be turned off.

Gameplay is adequate for a budget title but nothing very special. Overall, although cloned on Citadel, Spooksville just doesn't have the same atmosphere. My advice would be to buy the golden oldie and only go for Spooksville if you are truly dedicated to this type of arcade adventure.

Rog Frost

Sound	6
Graphics	6
Playability	6
Value for money	7
Overall	6

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World Class Leaderboard ... a hole in one

Price: £24.95
Supplier: US Gold, Units 2 & 3, Holford Way, Holford, Birmingham B6 7AX.
Tel: 021 625 3388

IN the wake of the current craze for golf games US Gold has developed its World Class Leaderboard – available on most other types of micro – for the Archimedes.

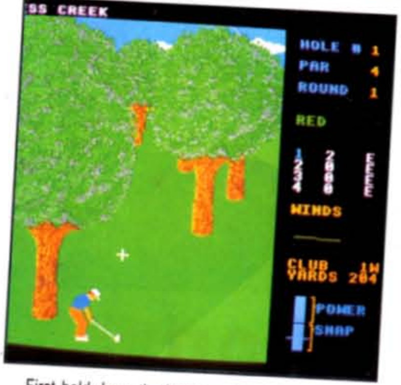
Booting the game results in the usual auto configuring plus an horrendous grinding of the disc drive – an onscreen message tells you that the disc is just being checked to ensure it's an original.

The title screen is of a high quality but the menu system leaves a lot to be desired on a mouse driven system. You get four options: Play game, putting green, driving range and course editor, selected by pressing an appropriate key, the mouse being defunct at this point.

Play game takes you through questions regarding number of players their names and relative skills – kids, amateur and professional. Next you specify the number of holes in multiples of 18 and finally the course selection A-D – supplied and based on real ones – or E-Z for your own.

The playing area occupies only a little over half the screen horizontally and the colours and sprite design are very hard on the eyes.

Now you get to use the mouse. The Adjust button is used to alter the direction of the shot, Menu cycles through the available clubs and Select is used to make the stroke.



First hold down the button and watch the strength build up, release it at the desired position then click it again to select the levels of hook or slice. The ball then shoots off into the distance.

This process continues until you reach the green, at which point you are limited to the putter and only strength and direction is controllable.

The putting green simply allows you to practise getting the ball down the hole, while the driving range lets you improve your swings. I couldn't get the course designer to work as it wouldn't recognise any disc.

Obviously Leaderboard is a rival to Holed Out!!, and while it has the advantage of genuine courses and a course designer it fails to match up in many respects.

The graphics are not full screen and although the Holed Out!! trees are stylised and unrealistic it is much easier to see what is going on. Club selection is very tedious on Leaderboard, although the actual stroke technique is better.

However the most important factor is realism. In Holed Out!! the ball's movement is so realistic that a poor putt can result in the ball rolling back down a slope beyond the point you hit it from.

And it's very common to hear cries of anguish from players as the ball bounces off the edge of the cup.

But in the Archimedes Leaderboard there's no such atmosphere. On the green the ball moves at the same speed regardless of slope and striking power from its start point to its finish and then stops abruptly.

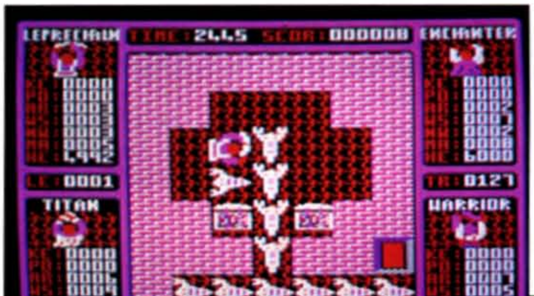
The only deviation occurs when the ball hits the cup and bounces. I have played this game on other machines and they were far superior to this implementation.

World Class Leaderboard on the Archimedes just doesn't make the grade.

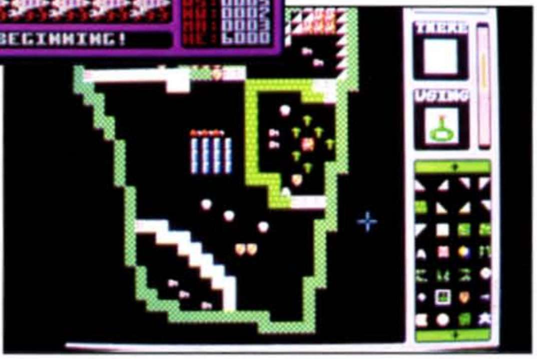
Steve Turnbull

Sound	*6*
Graphics	*7*
Playability	*7*
Value for money	*6*
Overall	*7*

White magic 2 ... design your own adventures



A ghostly start to the 8 bit White Magic 2



Playing with the Archimedes screen editor

Price: £9.95 (tape) £12.95 (5.25in disc) £13.95 (Compact 3.5in disc) £19.95 (Archimedes 3.5in disc)
Supplier: The Fourth Dimension, P.O. Box 4444, Sheffield
Tel: 0742 700661

HARD on the heels of White Magic come the sequel – on all BBC Micro formats at once. The new game hardly differs at all from the original apart from a slightly modified title screen and the addition of a screen designer. This review was done with the Archimedes version, but most general points cover the others, too.

You get 32 new levels to play and pretty tough they are too – after a full days play I only got to the fourth one – but they're still reasonable and not so hard that they discourage you.

Sound and graphics are exactly the same as on the previous version, which means they're adequate for the BBC Micro but not very good on 32 bit machines. The sprites resemble and move like the ones in Ravenskull.

However the screen designer is what White Magic 2 is really all about. On the Archimedes it's loaded with the main game, so pressing D at the menu takes you instantly into the the designer. The majority of the screen is blank, a scrollable window contains available icons and two areas show the piece of scenery under the pointer and the currently selected one.

To create a level you paint over the blank area with the pointer – the manual I used was only the draft version,

System 8 ... try making a fortune

Price: £2.99 (tape)
Supplier: Blue Ribbon Software, Nimrod House, Beckett Road, Doncaster DN1 4AD.
Tel: 0302 321134

EVERY week for the last 11 years I have religiously completed my 8 out of 10 column on the pools coupon. The more astute members of *The Micro User* readership will deduce that I have still to land my first big pools win since I am still writing reviews and not living it up on my private Caribbean island.

System 8, from Blue Ribbon, is a football pools predictor program that may improve your chances of winning. I use the word *may* because Blue Ribbon merely hints that its program will improve your success rate.

According to the cassette inlay card the program's database must contain at least four weeks' results before any level of prediction accuracy can be assumed. This means that you must persevere with the program for a whole month before you can begin to reap the benefits – although you could enter past results.

The data file on the tape is not intended for use with predictions – I know this because when I asked the program for its predictions based upon that data it selected all 10 matches from division one. Now this may have been a genuine prediction but I have a sneaking suspicion that sticking pins in the coupon would have proved more successful.

System 8 was written in 1988, so the default teams in each division aren't much use for the 1989/90 football season. Job number one therefore is to get hold of your latest pools coupon and shuffle the teams up and down between the various divisions until they are correct, then save the lot to a tape.

While on the subject, I would have found the program far more useable had it included a routine to transfer itself to disc – saving files to tape is positively primitive in these days of cheap disc drives. Perhaps they assume the software will only be bought by hard-up and desperate types!

Setting up the divisions is a once a season task, a more frequent chore is creating the weekly match list for every match in all seven divisions. For Saturday matches this list can be prepared in advance and saved ready for vidi-printer time on Saturday afternoon.

Result entry is actually the easiest routine in the whole program. The day's games are displayed on the screen one by one and all you have to do is press an S for a score draw, N for a no score draw, H for a home win and so on until every game has an associated result. Data entry complete, you can save your work in preparation for the following weeks matches.

System 8 will predict possible score draws for your treble chance entry or produce *Perm against Plan* columns that are ready to be copied straight to your coupon.

If you browse through the adverts in *The Micro User* you will see Pools predictor programs that cost almost 10 times as much as System 8. They may prove easier to use with their pre-prepared fixture lists, but at a price of £2.99 what have you got to lose?

James Riddell

Sound	*n/a*
Graphics	*n/a*
Playability	*n/a*
Value for money	*7*
Overall	*7*

but I did take heed of the warning that the border must contain solid characters. You needn't worry over much here, as the editor has fairly extensive error checks which include examining the border and ensuring there's a trapdoor and master key.

Of course what it can't do is check that the level can be completed – the design is up to you. It's easy just to sit down and start creating, but the overall size of the screen is huge and designing puzzles requires forethought.

My first screen was a lovely symmetrical affair with the start in the bottom left and the end in the top right. However when I came to test play it – via a pop-up menu – I had my first introduction to the less friendly aspects of this software.

The start position must be within a small area located in the top left of the screen – so much for my clever design – and no, there isn't a rotate option. Then there's a whole series of questions about what to call the level, the time limit and where the teleports transport to. Finally you're told what the edit code is – essential if you want to re-edit at a later date.

What is really annoying is that this happens every time you want to try out your creation. Why there couldn't have been another menu option to enter these details just once I really don't know, the rest of the editor is well designed.

Anyway I went back to the drawing board and designed a whole new level which worked exceedingly well. There are a great number of factors which control how to design a screen but you learn these through experience. A devious mind also helps.

Lazarus

8 bit BBC Micros	
Sound	*8*
Graphics	*9*
Playability	*9*
Value for money	*9*
Overall	*9*

Archimedes series	
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Playability	*9*
Value for money	*8*
Overall	*7*

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BANG!!!

Explosion right in front of me, I yanked the stick hard right, I hadn't expected flak this low. I had to take out the *ack ack guns.* Weaving I flipped off the safety clip and squeezed the trigger.

All I could hear was the deafening roar of *30mm cannon fire,* I watched the tracer burn down to the ground and pop the ack ack like crackers. The bridge was getting closer, over or under? Over and radar would pick me up faster than I could say... Fast, Under and, well, I might not make it.

Some choice, I went under and... I made it, straight into a hail of cannonfire from an enemy patrol fighter, I pulled the stick all the way back, he couldn't match my climb, before he knew it I had dropped on his tail and seconds later two of my *air to air missiles* had ripped him apart... Eat that sucker.

They were throwing everything they had at me now, I was on top of them, I went in on full throttle, they didn't know what hit them.

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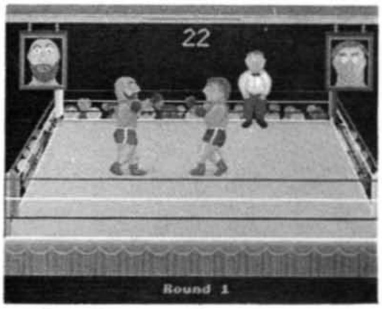

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Distorted characters

I HAVE a BBC B issue 4, OS1.20 which has recently started producing distorted characters. Although they are still readable in Mode 7 they are not in any other. The fault does not occur all the time, but is becoming more and more frequent, making proper use of the machine impossible.

I suspect that the video ULA may be at fault, but I don't want to buy a replacement only to find that I am mistaken. I would very much appreciate your advice.– **Anthony Oakley, Brighouse, West Yorks.**

● *Your problem could be the video ULA or it could be the memory. You don't say whether characters are changed in Mode 7, but as this mode uses a different way of forming its characters to any other you can use this to see which is the problem.*

If you have a memory fault then in Mode 7 instead of the characters breaking up they should change completely to another character. If this happens you have memory trouble, otherwise you have a ULA fault. The whole problem might just be due to overheating – see our August issue for a solution to that.

Micro flute

I WOULD like to build an electronic flute using the user port to detect the state of seven buttons. The tricky part is detecting how hard the mouthpiece is being blown so that the micro can adjust the volume of the note accordingly. One idea is to direct the air blown on to a spring which uncovers a light dependent resistor – the more it moves, the lower the LDR's resistance. The LDR could then be used as part of a potential divider connected to the user port.

However there must surely be a simpler and more effective way – so far I have had little success with this method. I can't seem to find a flimsy enough spring. Have you any ideas? – **Max Edwards, Faulkland, Bath.**

● *The problem with using an LDR is that its response is not fast enough and also it is non-linear, so you will not get a signal directly proportional to the amount covered up. The best bet is to use a paddle flow meter which is a wheel that spins round when you blow over it. You can then arrange for an opto-switch to be broken several times per revolution and use a frequency to voltage converter to feed into the analogue input port. You can build your own flow meter or get them ready made from Radio Spares for about £17.*

Rolling multisync

I USE a Taxan 770 Plus multisync monitor with my Archimedes 440. It suffers from grey rolling lines in the background which, although always moving upwards, vary in speed and spacing. It is very noticeable on plain colour screens. A recent review stated that the 770 has a rock-steady picture, so something is wrong. Could you please help? – **Mr. M. A. Milford, Via Prestel.**

● *These are known as hum bars and are caused by poor regulation inside the monitor's HT circuitry. It should not happen – and is best dealt with by professionals as the high voltage inside a monitor can kill.*

Language upgrade

I OWN a BBC B with twin 40 track disc drive and Watford DDFS. I would like to know if there is a Cobol language for this system and if not, could you tell me of any upgrades that would allow the language to run on my system? – **Daniel Ledgard, Featherstone, W. Yorks.**

● *Cobol is a language used in the business community – it has very little in the way of mathematical functions but is suited to writing payroll packages and the like. The only version of Cobol I know of runs on the Z80 second processor and requires the use of twin double sided 80 track drives. It comes free with the second processor, and while it is not a full implementation, it is still quite good enough to learn the language.*

Accents on screen

I NEEDED a program which would give me on screen accents for European languages on my BBC B, so I bought the Euroword package from Charm Micro Soft. But I now find that it will not run on my system. It loads for a while then cuts

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◀ From Page 41

out and an error message comes up on screen.

I have not tried to copy it or done anything which might have activated any anti-copying routines in the package. The software loads perfectly well on a neighbour's BBC Micro which has a slightly older DFS system, so there is clearly nothing intrinsically wrong with the program. Indeed Charm Micro Soft has been most helpful with suggestions to overcome the problem, but so far without success. The company has offered me a full refund but I would much prefer to get the system working. – **H.M. Le Mesurier, Wimbledon, London.**

● *Your problem is probably that you have Basic 1 in your machine and the software requires Basic 2. An upgrade chip can be obtained from Watford. One of the differences in Basic 2 is the OSCLI – Operating System Command Line Interpreter – command, which allows strings to be passed to the OS. It is possible to do this using Basic 1 but with a different method. As this will work with both versions of Basic it is used in most commercial software.*

Compact conversion

LAST Christmas I obtained a secondhand BBC B issue 7. However software on cassette and disc is very hard to get locally and it would be of great help if I could use 3.5in Master Compact discs. Could you please tell me if it is possible to emulate a Master Compact using a BBC B, and if so what sort of disc drive I need? Also what extra roms do I need – DFS or ADFS? – **David Elliott, Glanmire. Co. Cork. Ireland.**

● *As far as I know it is not possible to emulate a Master Compact completely on an ordinary BBC B, although you can come close. First of all you need a 3.5in drive – essentially this is electrically the same as the larger drives and can be connected directly.*

Then you will have to fit an ADFS system as opposed to the DFS normally used – this will need a small piggyback board fitted in the place of the normal disc controller. Finally you will need sideways and shadow ram. The adverts in this magazine should provide a choice.

You must also replace the 6502 chip with a 65C02 which has a few extra instructions. Unfortunately, a BBC B will not always function correctly with one of these due to timing problems.

You must understand that there are various aspects of the Master Compact that can't be emulated in this way. For example, there will be no real time clock or battery backed up memory to hold default perameters. Also you cannot display one screen bank while writing to the other – therefore even with all these upgrades you will not be guaranteed that Compact software will work.

> “It is not possible to emulate a Master Compact completely on an ordinary BBC B, although you can come close”

In the shadow

WHEN I plug Wordwise into my micro it operates until Y/N is displayed, but then either choice has no effect. This problem shows even when the chip was plugged into an alternative socket, but when it was plugged into another micro it operated perfectly, suggesting the chip was working. Could you advise me how to correct the problem in the faulty micro? – **T. Thomson, Glasgow.**

● *If your Wordwise chip is not working on your micro but it is on a friend's it is your machine that is at fault. Have you any shadow memory fitted, as early Wordwise chips would not work with this? Alternatively you could have a cracked track in your micro.*

Cassette leads

I HAVE recently acquired a data recorder with the instruction booklet, written in German. Although I understand enough to read that it will work on the BBC Micro and needs an external power source, I have no data cable for it and the book says it needs a special one.

Unfortunately there is no circuit diagram of either of the two DIN sockets at the back – one a five pin and the other seven pin. Could you possibly explain how this data recorder should be wired up? – **Brian Chalcroft, Castle Hedingham, Halstead, Essex.**

● *The term data recorder has been de-valued since the advent of home computers. It used to mean a recorder that took in logic levels and not tones. Assuming you have a recorder that uses tones it should be a simple matter to connect up. Being German, I expect it conforms to the normal DIN – Deutsche Industry Normal – standards.*

The seven pin socket is likely to be wired up in a similar way to your BBC Micro for audio input -- there might even be a low level output on this socket as well. The centre pin will be the earth and finally the five pin – the most anticlockwise pin looking at the socket – should carry the power – about 9 volts.

Formatting breaks

I HAVE a BBC Master with double sided 40/80 track disc drive and whenever I try to format a disc the drive and micro stop mid-way through the process – this happens on either track settings. I have to break out and start again, often several times, until the disc is formatted.

The micro is not freezing up as the Caps and Shift lock controls are operable and the cursor is still flashing. No error is reported, the machine just stops with the cursor still in place as if it was still formatting. Could you please tell me if it is a faulty disc drive, micro, or just dirty drive heads? – **Marcus Clark, Bristol.**

● *Your disc drive is definitely not at fault. It's either the formatting program or something wrong with the disc controller chip. When the micro commands this to do something it generates an interrupt to say it is done and requests something else to do.*

This interrupt signal could be missing or more likely getting lost in a loose connection on the way to the microprocessor. Test that IC27 is properly in its socket along with the disc controller chip, and link S9 is broken and link S7 is sound.

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Adding

Bruce Goatly explains how to get graphic results from DTP packages

WE began looking at what desktop publishing can do last month and left you getting started on planning your publication and typing in the text you will need. Now we must organise ourselves a bit before we can turn to the complementary part of publishing – the illustrations.

Many of the DTP programs available for BBC Micros – some were listed in the first article – take quite a lot of setting up, with several discs to keep track of. This is because you will be handling files of a number of different types, such as complete pages, cutouts, screens, text files, fonts and patterns.

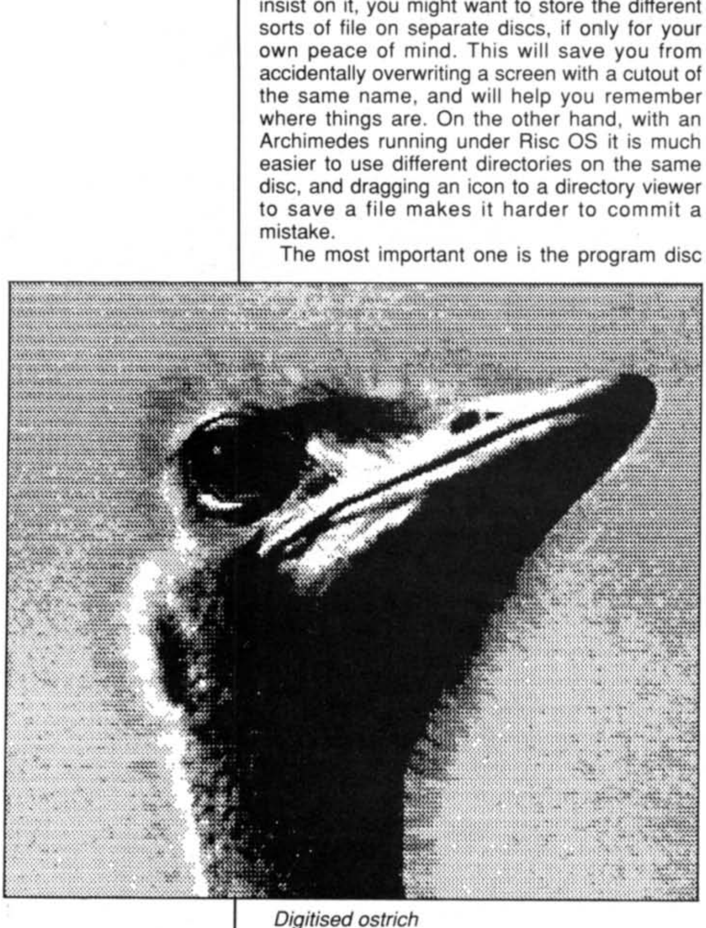
In fact even if your particular program doesn't insist on it, you might want to store the different sorts of file on separate discs, if only for your own peace of mind. This will save you from accidentally overwriting a screen with a cutout of the same name, and will help you remember where things are. On the other hand, with an Archimedes running under Risc OS it is much easier to use different directories on the same disc, and dragging an icon to a directory viewer to save a file makes it harder to commit a mistake.

The most important one is the program disc itself, often referred to as the system disc. Only Wapping Editor for the BBC B, Master and Compact doesn't have one of these because the software is in rom, but even so it uses routines not on the rom which therefore have to be made available to the program at times.

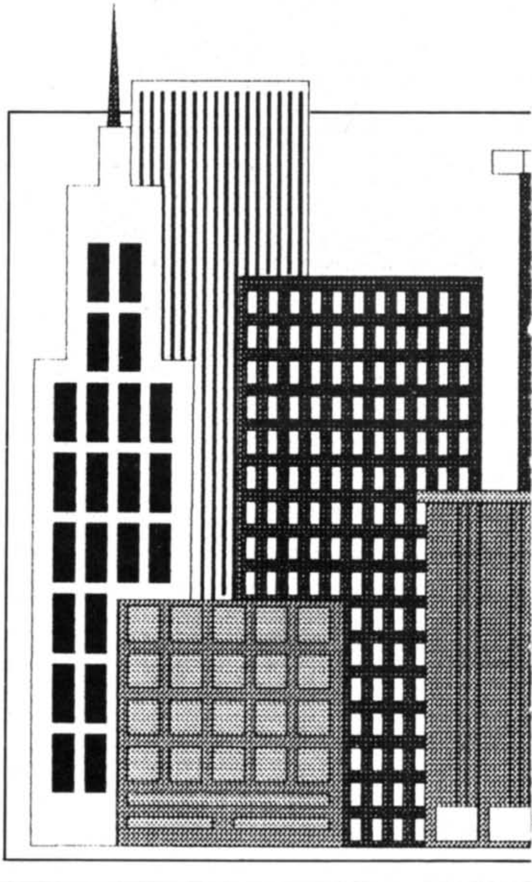
If you can make a backup copy of the system disc to use in its place, do so. Not all system discs can be copied, however, because of protection devices against piracy.

Some programs will let you make a backup copy that almost works but which stops at a crucial point until you insert the original, the key disc. This is not much of an improvement on an uncopyable master disc – you must still keep the precious original on hand instead of safely out of harm's way.

Most DTP packages won't let you do anything until you have loaded a page to work on, which



Digitised ostrich



figures

is logical if you think about it for a moment. After all, most use the disc as virtual memory for storing pages larger than the machine can handle at once. So the first thing you are likely to have to do is make sure you have a blank page to load.

Some software, such as Stop Press, formats each page disc in a special way – never save anything else to it. Others, such as Pixel Perfect and Wapping Editor, create blank pages on an already formatted disc.

Another sort of file you'll be using, font files, are a way of adding variety to the words on your page, and we'll look at those next month. Some programs, such as Stop Press and Wapping Editor, let you use font-like files as patterns or brushes when you are drawing your own pictures.

So now let's look at how you can generate pictures for your publication. They fall into three main categories – ready made, electronic and do-it-yourself. As we shall see, the boundaries of these types overlap somewhat because your micro is used for manipulating images deriving from any of them, but they form a useful starting point.

Ready made pictures are often supplied with DTP software or can be bought as extras in the form of clip art or cutouts. Although there are differences between the two, for our purposes we can think of them both as the equivalent of a scrapbook of pictures that you can paste on to your page in any position you like. Cutouts contain information on the size and shape of the image as well as the graphics themselves.

DTP software on the Archimedes doesn't use cutouts as such because there are other, more standard, ways of generating and storing pictures. These are sprites drawn with the Paint program or other commercial painting software and line art drawn with the Draw program.

Also on the fringes of the ready-made category are screen files on the 8 bit machines. These are essentially complete screens saved in normal format rather than in a special way like pages or cutouts. This means you can make use of pictures for your micro that have come from other sources.

If some of your pictures are in the wrong screen mode for use by your DTP package, almost all can convert screens from other graphics modes, so there is plenty of scope for exchange of images with your friends or colleagues. Electronic creation of illustrations is

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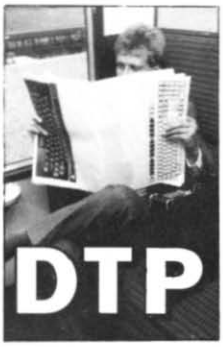
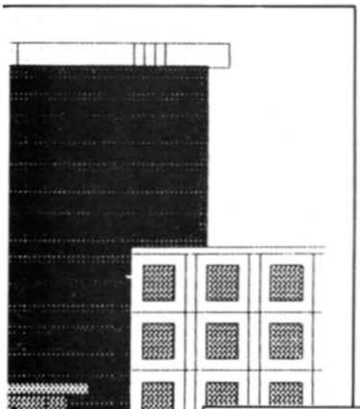
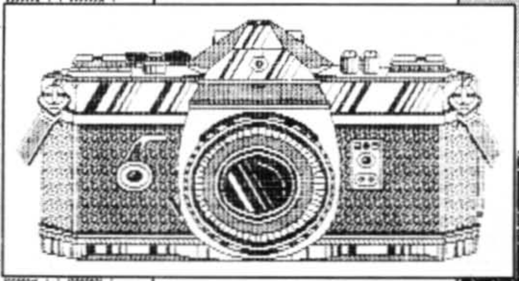
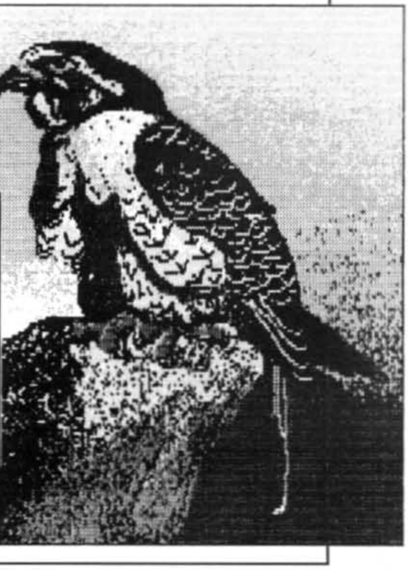
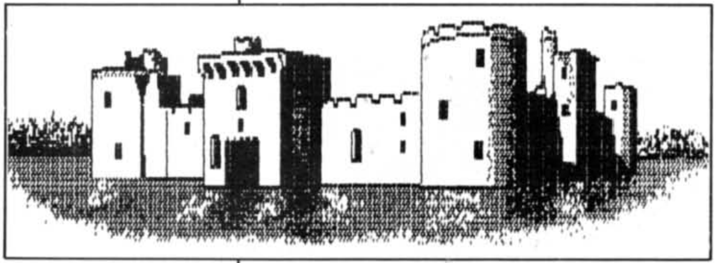



Skyline sprite from Draw on the Archimedes, printed with Acorn DTP


Cutout camera from Pixel Perfect


Eagle sprite drawn with Clares' Artisan and printed with Acorn DTP



Clip art castle from Stop Press

◄ **From Page 45**

probably the most exciting prospect for DTP. Imagine it – just letting your hardware do the grafting on your artwork. Of course it is up to you to perform the fine tuning to get the exact image you want, but it still takes the tedium out of graphics.

Until recently the only way to acquire a picture electronically for your machine was to use a video digitiser, the best known for the 8 bit BBC Micro being sold by Watford Electronics. This takes a signal from a video camera, video recorder or television and converts it into a Mode 0, 1 or 2 screen. If you wish you can alter the image in various ways before saving it to disc.

If you don't want to buy your own digitiser you can always ask someone who has one to do it for you. Some people make a business out of digitising videos.

The latest hardware development for serious DTP work has been the scanner, a device that does for images in the real world – printed pictures or even wallpaper – what a digitiser does for video signals. New advertisements for scanners for the Archimedes seem to be springing up like mushrooms at dawn, so there is plenty of choice, there's even one for the 8 bit machine. But remember that hardware is only as good as the software that drives it, so try before you buy.

The last approach, doing it yourself, calls for some artistic skill, but less than you might imagine. For with a micro you can take as many tries at it as your patience will permit, gradually improving what you have drawn and saving each version in case you botch the next attempt completely.

The art department is also where we begin to see real differences of philosophy between the 8 bit DTP packages and some of those for the Archimedes. Let's consider them briefly, because they have important implications later.

The BBC B is limited by a relatively slow processor and a lack of memory. In combination these factors prevent calculations from being done fast enough to deal with text and graphics in different ways – both have to be treated as graphic images once they have been placed on a page.

This makes a complete page too big to be held in memory at one time, forcing the writers of 8 bit DTP packages to divide pages into screenfuls. As a trade-off, such software tends to have reasonable graphics facilities, so you can draw both geometrical designs – circles, squares, lines and so on – and freehand art, with brushes, spray patterns and pixel editing.

The Archimedes suffers from no such disadvantages, with a fast and powerful central processor and plenty of memory. As a result the Archimedes DTP programs – except for Pixel Perfect – handle the various items on a page independently and much more flexibly. They also tend not to include much graphics capacity, if any, because the Welcome disc contains software suitable for the purpose.

So most of the following tips on graphics apply mainly to the BBC B and Master series. First consider your equipment. If you intend to do any freehand drawing you will really need a mouse, because using the keyboard for drawing smooth curves is very hard work, if not virtually impossible. If you're going to use a mouse, you should obviously choose a DTP package that supports one. Many do, although our home-grown package and the 8 bit version of Pixel Perfect do not.

Next, bear in mind the different resolutions of the screen and your printer. One pixel on the screen may end up being printed as several, with a correspondingly grainy result. In addition the horizontal and vertical resolutions of the screen and the printer are different, usually causing the printed product to be stretched sideways.

The effect is most noticeable with regular figures such as circles, which become ellipses. It is not really a problem with freehand art, which can stand a certain amount of distortion. Some DTP programs have special ways of avoiding it, either by adjusting the proportions of the graphics on screen or by using a special printer dump routine. The latter option is not, however, compatible with all printers.

Try to get the size of your illustrations in proportion to the page on which they are to fit and the text they must appear with – not all programs allow resizing except to half or double size.

● *Now it's over to you for another month: Get digitising, scanning or drawing that logo, cartoon, portrait or landscape, and develop your plans further. Next month we're going to see what we can do with the text you've been typing in.*

MICRO MEMORIES

Facts and tips you may have forgotten...or never known

GAMES' sound effects can often become irritating – especially to other people. Most games include a feature to toggle the sound status between on and off but, for those that don't, you can do it yourself by using *FX 210. This command is used with either 0 or 1 to determine whether you wish the sound on or off:

```
*FX 210,0   Enable sound output
*FX 210,1   Disable sound output
```

So to silence games type *FX 210,1 and CHAIN the program as usual. Disc users should not press Shift + Break to boot their games, as this would disable the command. In most cases typing *EXEC !BOOT will load the disc but if this doesn't work you should use *RUN !BOOT.

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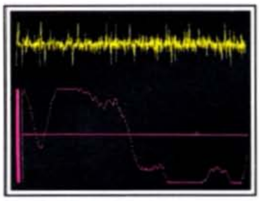
How does it work? A sound sampling package consists of two main components. Hardware and software. The hardware is on a board, which can fit into an Archimedes backplane. There we fit external devices like a microphone, hi-fi or a CD player which allows input. The sound is then simply imported into the computer, and that's all there is to it.



What is sound sampling useful for? There are many varied uses. Sound sampling is professionally used in recording studios. Analysing musical characters and pieces, allowing various parts to be recognised and changed. And more commonly, it's used for fun, creating wild and whacky noises, or sound tracks for home videos and computer programs.

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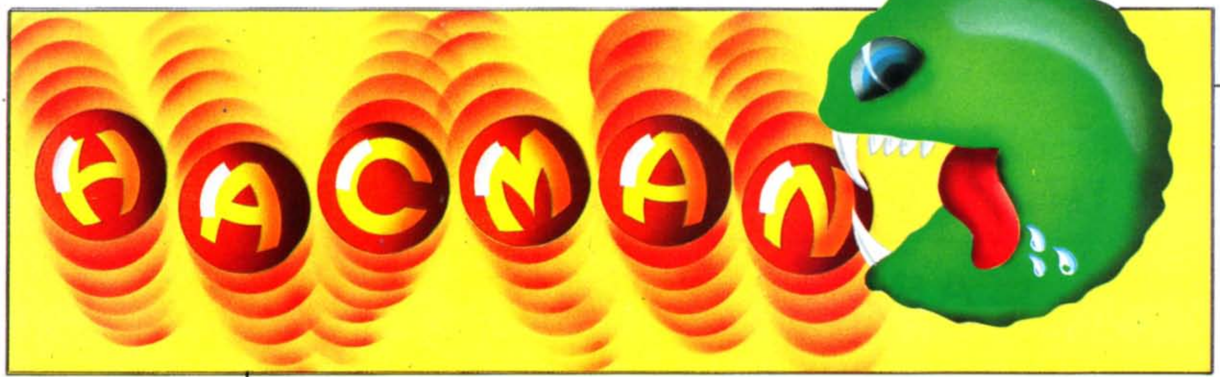

B B+ M

Featuring:

Strike Force Harrier
The Life of Repton
Wizzy's Mansion
Castle Quest
Rogue

Conversion capers . . .

Hac Man ponders the problems of using games on different generations of BBC Micro

I THINK of all the many varied things I have featured in this column over the years, the ones I have most enjoyed have been the conversion routines to allow older and illegally written games to run on the BBC B+ and Master 128.

The CONVERT utility, written by Acorn and supplied on the Welcome disc, is not particularly highly regarded by those who have found themselves at the pointed end of the different hardware vs incompatible software situation.

True, it will not intercept the direct calls to the BBC B's OS1.20 rom present in all the Ultimate games. Equally it will not cure the problems generated by games, particularly those from Icon and Tynesoft, that use their own custom screen character row multiplication tables – A feature of the BBC B that is not used on the Master.

There are many games that use illegal programming techniques that CONVERT does not convert, but on the whole it does a fairly reasonable job of persuading many of the less flagrantly illegal games to run on the Master. One that does work with CONVERT, according to Matthew Campbell of Bishop's Stortford, Herts, is Mirrorsoft's flight simulation **Strike Force Harrier**. I have never played it – Aviator has always fitted the bill of a flight simulator for me – but I understand it to be one of the better ones, so I am glad to see that it is available to a wider audience than that for which it was written.

It's not only running BBC B software on Masters that causes problems. I still regularly receive letters from readers asking for help with games that will not run on their machines. One such troubled reader is Jeremy Flax of London, who says: "I have the following games for my BBC B+: Dunjunz, Star Wars, Jet-Pac and Sabre Wulf. Please could you publish some routines to make them work".

Jeremy did not say whether he owned cassette or disc copies but I know for certain that the cassette version of Dunjunz works only on the BBC B. The disc version of Dunjunz works perfectly on the Master and so should work on the B+, but I cannot say for certain. If you own Dunjunz on cassette Jeremy, my recommendation would be to ask the shop from which you bought it if they could part exchange it for the disc version.

STAR WARS
BBC/ELECTRON
JET PAC
RICOCHET

Unfortunately I do not own a copy of Star Wars, so I cannot help in this direction, but perhaps a reader may be able to offer some advice?

In the case of the last two games, the problem of not knowing whether Jeremy owns a cassette or disc does not arise, because no Ultimate game has ever been released on disc. However,

Revolutionary Quest

Castle Quest attracted a lot of attention when it was first released as it introduced a number of then revolutionary programming concepts. I recently received a letter from J. Moh of Worcester Park, Surrey, who has a few problems with it. He has got the wand and presumably killed the witch, which is probably the most important part of the quest, but is stuck elsewhere.

The four small characters, which Mr Moh calls monkeys, must be herded together to allow you to pass underneath the spiders unharmed. They do not help you to get across the bridge.

Adventure fans will be familiar with the concept of the troll's bridge and that you must be all but Atic Atac and Lunar Jetman have appeared in more than one form.

The problem of re-released versions of games which are not the same as the originals is one that has been well covered in this column and will be well known to readers. Nevertheless, I am fairly confident that all released versions of any particular Ultimate game are identical.

A routine to convert Jet-Pac to run on the Master appeared in the July 1987 column. I wrote the conversion for the original stand-alone Jet-Pac, but I cannot see any reason why it should not work with the versions on the Unbelievable Ultimate or Cosmic Battlezones compilations, or with the version that appeared as a budget game on Mastertronic's Ricochet label.

I haven't got a B+ to Master conversion routine for Sabre Wulf yet but I hope to be able to feature one soon, so please be patient.

Rogue works

While on the general subject of software compatibility, I mentioned in the February 1989 column that I had recently acquired a Master 512 co-processor board. I also mentioned that I had come across a dungeons'n'dragons-style game by the name of **Rogue** – a sort of deskbound Shades. I said then that Mastertronic had recently given Rogue a major facelift and re-released it, but that this new version unfortunately did not work on the 512. This is essentially still the case.

However, a few months ago I came across a program that I have come to believe every Master 512 owner should own. It goes by the name of Problem Solver and is produced by a Portuguese company called Shibumi Soft. In essence it makes the PC-compatible Master 512 far more PC-compatible, and allows a number of previously-incompatible PC programs, both business and games, to run on this combination.

Problem Solver is supplied with a utility called VISI+ that intercepts illegal screen display routines and converts them to a format suitable for the 512. Rogue uses just such an illegal routine. The correct sequence to persuade Mastertronic's Rogue to work on the 512 is as follows:

Boot the machine with either DOS+ 1.2 or 2.1 – it will work on either. Insert the Problem Solver disc and type PS. When the DOS prompt reappears, type VISI. Insert the Rogue disc and type ROGUE.

Rogue will now work perfectly, except that it has the slightly annoying habit of not correctly clearing the line on which it displays its messages. Nevertheless, this excellent game is now at last available to many games players who would have otherwise probably never seen it.

One last point is that Rogue is one of the few games that displays the time on-screen. This is with good reason: Once hooked, you can spend hours at it. You have been warned.

Editing Repton

The Life Of Repton
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In the two years since **The Life of Repton** was first released, I have received a few letters from readers saying that the editor on the disc version sometimes does not work. I have never found this myself or met anyone who has experienced it. However, Simon Earl of Wimbourne, Dorset, offers the following solution to anyone who may be having problems persuading the editor to load. Simply type the following:

```
LOAD"E.EDITOR"
12*DIR E
RUN
```

I hasten to add that I have not checked this routine because the editor has never failed to load for me. However, I hope it will be of use to those who have had problems with it.

Virgin cheats

In the January 1988 column I mentioned that **Wizzy's Mansion** has a cheat mode that can be activated by typing "LIKE A VIRGIN". I said then that I hadn't actually seen this game, and I asked if anyone could tell me what this cheat mode did.

Wizzy's Mansion is still an unknown quantity to me, but Eric Mather of St Helens, Merseyside, reports that activating the cheat mode provides the player with infinite lives and also has the effect of speeding up the game when repeated. Thank you, Eric.

carrying something of value with which to bribe it to let you pass. However, this may be new to arcade players. When you want to cross the bridge make sure that you are carrying the ruby, gold bar or gold piece in your hand. As soon as you get close to it, the troll will come out to you, take the treasure and deposit it in its lair underneath the bridge. If you are still on the bridge it will then come back after you.

This makes it easy for you to recover your stolen treasure: Wait briefly to see which route the troll takes back up to the bridge, then climb down the other ladder, pick up the item, climb back up and run away before the troll gets within range. Easy.

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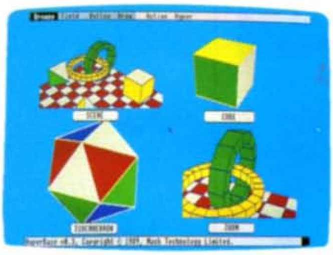

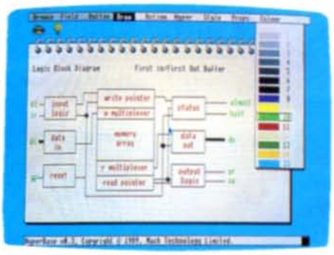

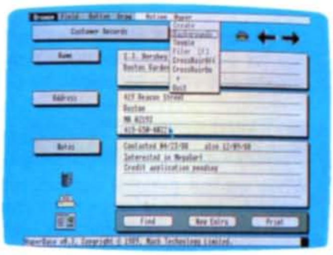

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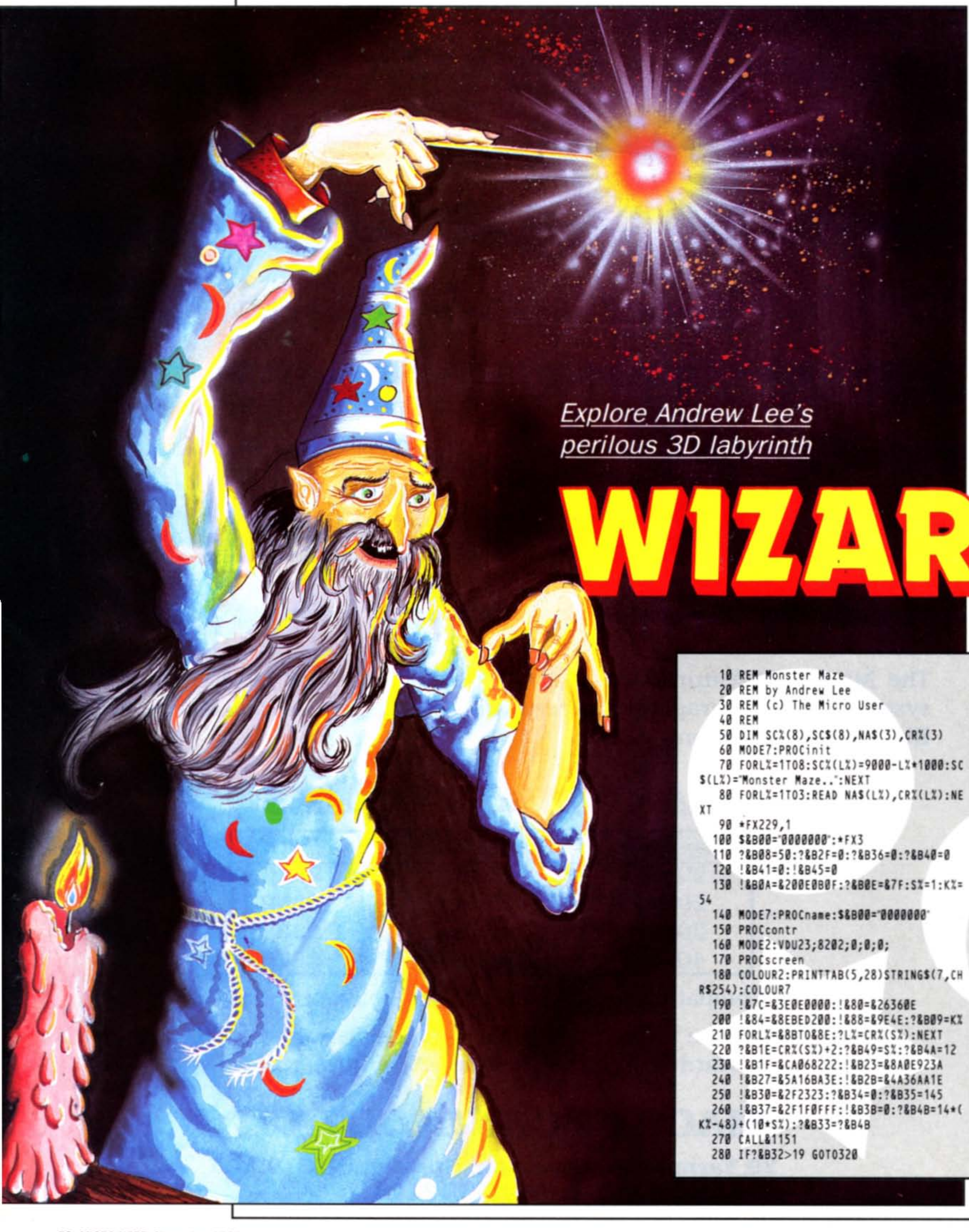


Explore Andrew Lee's perilous 3D labyrinth

WIZAR

```
   10 REM Monster Maze
   20 REM by Andrew Lee
   30 REM (c) The Micro User
   40 REM
   50 DIM SC%(8),SC$(8),NA$(3),CR%(3)
   60 MODE7:PROCinit
   70 FORL%=1TO8:SC%(L%)=9000-L%*1000:SC
$(L%)="Monster Maze..":NEXT
   80 FORL%=1TO3:READ NA$(L%),CR%(L%):NE
XT
   90 *FX229,1
  100 $&B00="0000000":*FX3
  110 ?&B08=50:?&B2F=0:?&B36=0:?&B40=0
  120 !&B41=0:!&B45=0
  130 !&B0A=&200E0B0F:?&B0E=&7F:S%=1:K%=
54
  140 MODE7:PROCname:$&B00="0000000"
  150 PROCcontr
  160 MODE2:VDU23;8202;0;0;0;
  170 PROCscreen
  180 COLOUR2:PRINTTAB(5,28)STRING$(7,CH
R$254):COLOUR7
  190 !&7C=&3E0E0000:!&80=&26360E
  200 !&84=&8EBED200:!&88=&9E4E:?&B09=K%
  210 FORL%=&8BTO&8E:?L%=CR%(S%):NEXT
  220 ?&B1E=CR%(S%)+2:?&B49=S%:?&B4A=12
  230 !&B1F=&CA068222:!&B23=&8A0E923A
  240 !&B27=&5A16BA3E:!&B2B=&4A36AA1E
  250 !&B30=&2F2323:?&B34=0:?&B35=145
  260 !&B37=&2F1F0FFF:!&B3B=0:?&B4B=14*(
K%-48)+(10*S%):?&B33=?&B4B
  270 CALL&1151
  280 IF?&B32>19 GOTO320
```

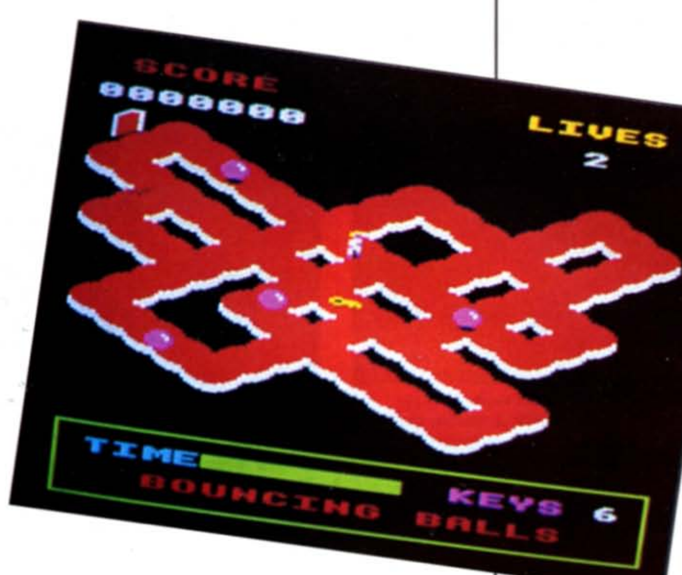
CALLING Mycroft the Magician an idiot turned out to be a bad move, he cast you into the depths of a maze populated by strange monsters. Each section has a single door and you have to collect a number of keys before it can be opened. The keys themselves appear one by one as you run from corridor to corridor frantically avoiding the onrushing creatures.

Once through the door you enter yet another realm of crazy complexity and mindless monsters. However all is not lost, sometimes you will be able to create cups of tea. When you drink them all the beasties vanish for a short time so you have a free run.

Controlling your movement is easy.

Key	Effect
A	Up/left
Z	Down/right
*	Up/right
?	Down/left

Type in the game, ensure it is correct using the checksums and then save it – this is important as the program relocates itself.



D'S REVENGE

```
  290 ?&B08=?&B08-1
  300 IF?&B08=47 CLS:PRINTTAB(5,13)"GAME
 OVER":FORL%=1TO10000:NEXT:GOTO110
  310 GOTO180
  320 S%=S%+1
  330 B%=(?&B32-19)*50
  340 CLS:COLOUR2:PRINTTAB(5,13)"WELL DO
NE"
  350 COLOUR3:PRINTTAB(4,15)"BONUS";
  360 COLOUR1:PRINT" = ";B%;
  370 B%=B%+VAL$&B00
  380 $&B00=STRING$(7-LENSTR$B%,"0")+STR
$B%
  390 FORL%=1TO20000:NEXT
  400 IFS%=4 S%=1:K%=K%+1
  410 IFK%=58 K%=54:?&B40=1
  420 GOTO160
  430 DEFPROCcontr
  440 CLS:FORL%=1TO2:PRINTTAB(8,L%)CHR$1
32CHR$157CHR$141CHR$135"MONSTER MAZE"SPC
3CHR$156:NEXT
  450 PRINT'SPC10CHR$130"by Andrew Lee."
  460 PRINTTAB(6,7)"Directional Keys :-
A,Z,*,/"
  470 PRINT'"S - Sound On"'"Q - Sound Of
f"''"DELETE - Pause game"''"COPY    - Unpa
use game"''"ESCAPE - Quit game"
  480 PRINTTAB(7,22)CHR$136"Press RETURN
 to play"
  490 REPEAT:UNTIL INKEY-74
  500 ENDPROC
  510 DEFPROCname
  520 FORL%=2TO3:PRINTTAB(3,L%)CHR$129CH
R$157CHR$141CHR$131"MONSTER MAZE TOP EIG
HT  "CHR$156:NEXT:L%=8
  530 FORI%=1TO8
  540 IFVAL$&B00>=SC%(I%) FORL%=8TOI%STE
P-1:SC$(L%)=SC$(L%-1):SC%(L%)=SC%(L%-1):
NEXT:SC$(I%)="":SC%(I%)=VAL$&B00:$&B00="
0000000"
  550 PRINT'SPC7;I%CHR$134SC$(I%)STRING$
(14-LEN(SC$(I%)),".")CHR$133SC%(I%)
  560 NEXT
  570 *FX15,1
  580 IFL%<8 PRINTTAB(6,22)CHR$131"PLEAS
E ENTER YOU NAME"TAB(9,L%*2+5);:A%=0:X%=
&A:Y%=&B:CALL&FFF1:SC$(L%+1)=$&B0F
  590 VDU23;8202;0;0;0;
  600 PRINTTAB(3,22)CHR$136"Press SPACE
BAR to continue"
  610 REPEAT:UNTIL INKEY-99
  620 ENDPROC
  630 DEFPROCscreen
  640 COLOUR1:PRINT'" SCORE";:COLOUR3:PR
INTSPC8"LIVES"
  650 COLOUR6:PRINTTAB(1,28)"TIME":COLOU
R5:PRINTTAB(13,28)"KEYS"
  660 COLOUR1:PRINT'SPC3NA$(S%)
  670 GCOL0,2:DRAW0,160:DRAW1279,160:DRA
W1279,0:DRAW0,0
  680 GCOL0,8:MOVE48,872:VDU5,251,8,10,2
50:GCOL0,15:VDU8,252,8,11,253
  690 RESTORE (850+(S%*60))
  700 FORL%=0TO60STEP4:READ N$
  710 L%!&2C07=EVAL("&"+N$):NEXT
  720 RESTORE (1070+(S%*20)):X%=0:Y%=800
:READ A%
  730 VDU19,15,A%;0;19,14,1;0;19,13,2;0;
19,12,3;0;19,11,3;0;19,10,5;0;19,9,6;0;1
9,8,7;0;
  740 READ D%,N%
  750 IFD%=0 VDU4:ENDPROC
  760 FORI%=1TO4
  770 IFD% AND 2 R%=64 ELSE R%=-64
  780 IFD% AND 1 C%=32 ELSE C%=-32
  790 FORJ%=1TO(N% AND 2)
  800 FORL%=1TO(N% AND 1)*3+2
  810 PROCcircle:X%=X%+R%:Y%=Y%+C%
  820 NEXT:NEXT
  830 D%=D%/4:N%=N%/4:NEXT
  840 GOTO740
  850 DEFPROCcircle
  860 GCOL1,15:MOVEX%,Y%:VDU240,241
  870 VDU8,8,10,242,244,8,8,10,246,248
  880 GCOL1,8:VDU8,8,247,249,8,8,11,243,
245
  890 ENDPROC
  900 DATA BOUNCING BALLS,9,SPRINGY THIN
GS,12,DEADLY  FROGS,13
  910 DATA 881088C4,48CC4808,84CC808
  920 DATA C88CC8,C84C04C4,4C8CC848
  930 DATA 8C088808,C6C60C,4C0C5404
  940 DATA 5494CC8C,4C484C8,48888
  950 DATA 4808844C,44840890,C84484C8
  960 DATA 444488
  970 DATA 848C884,84C0C48,D0940848
  980 DATA 84CC88,88108804,C48444D0
```

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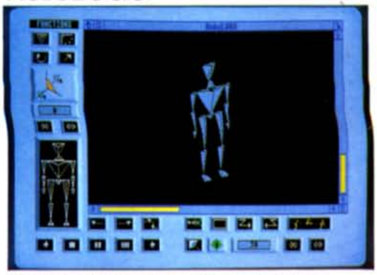

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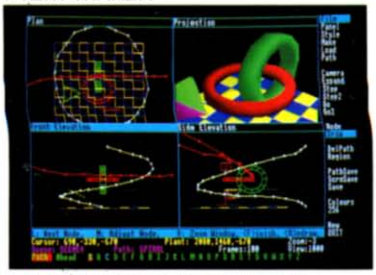

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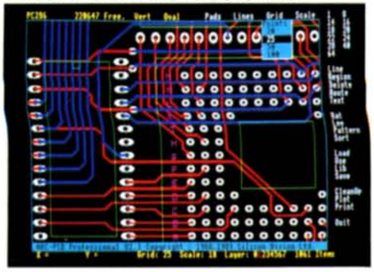

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We recently concluded a short series on fractals. However, since then our postbag has been bulging with comments and suggestions, so here we combine and expand on some of the ideas already described.

Those fascinating fractals

Mike Cook delves deeper into the intricacies of natural mathematics

OUR fractals series first looked at the deterministic type generated by the systematic application of rules. Then we saw a method of producing ones generated by the random process of diffusion limited accretion. Now let's consider a mixture of the two systems – a deterministic fractal generated by random numbers.

At first sight this might seem a contradiction in terms – how can a random process always result in the same fractal? The answer lies in what is termed *The strange attractor*. We all know what constitutes an attractor, and judging from the current political scene a strange attractor is what many people vote for. But in mathematical terms an attractor is a point exerting a pull on other points. In physics we could say the attractor of gravity is located in the centre of the Earth – it is trying to pull all other bodies to it.

A series of mathematical expressions can also form an attractor. Take any number on your calculator and repeatedly press the squaring key. You will find the number will change rapidly, being attracted to infinity or zero depending on whether the number you started with was above or below one. That sort of attractor is simply a point: A strange attractor is not just a point but a curve.

It turns out that it is no ordinary curve either – as you might have guessed from the title of this article, it turns out to be a fractal. There are many ways of generating a strange attractor and I will only look at one this month, that of *affine transformation*.

This is simply another name for geometrical transformation. If you take any shape – a square for example – you can subject it to a number of transformation operations. The simplest is to move it left, right, up or down and this is known as translation. Next you could rotate it around the origin, and finally you can alter the size without altering the shape – scaling. Figure I shows the basics of these three operations.

It turns out that anything you can do to a shape can be boiled down into a sequence of these three operations. So let's choose a point at random and repeatedly apply the same transformations to it.

The point will move towards an attractor which is normally at infinity. But suppose we have more than one set of transformations, say three. We select a point at random and then choose a transformation to apply to it at random too. This results in a new point, so we take that and apply another randomly chosen transformation and generate a new one.

Whenever we generate a new point we plot its position. Now intuitively you might say that points will be scattered at random all over the screen but you would be wrong. What happens is that the points congregate on the strange attractor: Large areas of the screen are not visited and the strange attractor fractal is repeatedly visited. All this despite the fact that we are choosing the transformations to apply randomly.

Hidden in the set of transformations is a fractal strange attractor. It turns out that any set of transformations applied this way will generate a fractal. However, special sets generate pleasing fractals, even ones we have seen before. Despite the random choices, the fractal is determined by the transformations used.

Enough of this chat, let's see how we can apply this using our micro. Listing I shows a simple program to generate fractals by repeated applications of transformations – it will run on any BBC Micro or Archimedes.

Each transformation is read into an array along with a probability of being chosen. Line 50 determines the number of transformations to use. The transformation values themselves are held in Data statements, starting at line 260, which can be altered to other values as shown in Table I. In the listing the transformations produce a fern.

Lines 90 to 130 pre-multiply the transform-

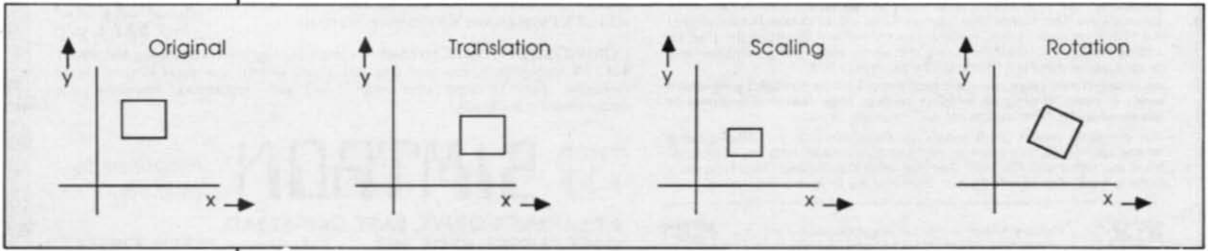

Figure I: A square and the three possible transformations

ation coefficients to save computational time. Then the program goes into an endless loop, repeatedly applying a random transform and plotting each new point. When it is run you will see the fern shape slowly appearing.

Two factors in line 310 affect the scaling and translation of the overall picture. If you alter them you can shrink or expand the fractal, but because it's a fractal as you change the scale the curve will look very similar.

The program in Listing II will run on an Archimedes or extended BBC Micro system – see later. It essentially performs the same task as Listing I although it operates in a much more user-friendly manner. There is a front page to allow you to enter and amend the parameters of the transformations easily.

Use the cursor keys to move the flashing cursor under the value you want to change and type in the new value followed by the Return key. The D key will start the drawing process which will continue until you press the spacebar.

In addition, each point is not just plotted but incremented. Each time a point is visited the colour number is read and incremented up to a limiting value of 63. This means that less frequently visited points will be shades of red and most visited points cyan and white. The whole fractal attains a glowing colour.

I have not used any of the new Basic control structures, so it could be modified easily to run on an extended BBC Micro system, either using shadow ram or a second processor. Line 20 sets the mode and, due to the front page layout, it needs to be 80 columns – Mode 0. It's best if you alter line 220 to change to a colour mode – 1 or 2 – before entering PROC–DRAW and change back to Mode 0 when you come out. This would make line 220 read:

```
220 IF FG AND NT%>1 THEN MODE1:PROC_DRAW:MODE0
```

Line 70 sets the maximum colour number for the mode you plot the curve in. This should be changed to 3 for Mode 1, 7 for Mode 2.

Also, as the 8 bit BBC Micros do not have a TINT command, the end of line 1380 should be deleted. This makes the new checksum for that line 3BF4 and the cumulative sums for lines 1380 to 1530 will become:

```
CFEAC55F00C8D999
```

Any transformations will produce a fractal of some sorts but many of them can be categorised as splodgy blobs. The table gives transformations that produce some pleasant fractals. Note we can even produce a Sierpinsky triangle by this method – a curve produced by deterministic rules in the first article about fractals. Take these transformations as starting points and alter one variable at a time and see what it does to the result.

You might notice, however, that some of the fine detail in these curves is a little fuzzy when compared with the rule base drawing. This is because a fractal has an infinite amount of detail. Using the rule base program we limited this by defining the order of the curve.

Using transformations like this we are generating all the fractal. However, we only have a finite number of spaces in which to plot the points – screen pixels. This gives the resulting image a natural limit so rounding errors will then cause a fuzziness around fine detail.

This technique is being investigated to see if it can be used to compress digitised colour images. If you get the correct transformations, in theory any picture can be reproduced. To send the picture you need only send the transform parameters. Some success has been reached with 4k's worth of parameters defining a colour picture of a landscape, clouds and factory chimneys.

As a postscript to the first article in the series I plotted a sixth order Hilbert curve for my wife to embroider. When she had finished she turned it over to look at the work side and found, to our surprise, a perfect fifth order Hilbert curve. Now that's something to think about.

Turn to Page 59 ▶

Example transformations to try

SIERPINSKY TRIANGLE

Translation		**Rotation**		**Scale**		**Probability**
X	Y	X	Y	X	Y	
1	1	0	0	0.5	0.5	0.5
50	1	0	0	0.5	0.5	0.5
50	50	0	0	0.5	0.5	0.5

Overall image parameters

Magnification		**Translation**	
X	Y	X	Y
10	10	0	0

BIFURCATING TREE

Translation		**Rotation**		**Scale**		**Probability**
X	Y	X	Y	X	Y	
0	0	-90	90	0.6	0	0.5
0	0.2	45	-45	0.6	0.6	0.5
0	0.2	-45	45	0.6	0.6	0.5
0	0.2	0	0	0.1	0.1	0.5

Overall image parameters

Magnification		**Translation**	
X	Y	X	Y
2000	2000	620	128

QUARTER REMOVED RECTANGLE (Listing II only)

Translation		**Rotation**		**Scale**		**Probability**
X	Y	X	Y	X	Y	
0.5	0	90	-90	0.5	0.5	0.5
0	0.5	0	0	0.5	0.5	0.5
0.5	1	-90	90	0.5	0.5	0.5
0.333	0.333	0	0	0.333	0.333	0.5

Overall image parameters

Magnification		**Translation**	
X	Y	X	Y
1000	1000	0	0

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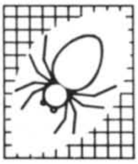

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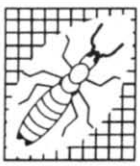

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Listing I

```
   10 REM >AFINE0
   20 REM RANDOM TRANSFORMATIONS BY Mike
 Cook
   30 REM Micro User Sep. 1989
   40 MODE 0
   50 NT%=4 : REM Number of Transformati
ons to use
   60 DIM T1(NT%),T2(NT%),T3(NT%),T4(NT%
),T5(NT%),T6(NT%),PB(NT%)
   70 FOR T=1 TO NT%
   80 READ T3(T),T6(T),A,B,R,S,P
   90 PB(T)=P*1000
  100 T1(T)=R*COS(RAD(A))
  110 T2(T)=S*SIN(RAD(B))
  120 T4(T)=R*SIN(RAD(A))
  130 T5(T)=S*COS(RAD(B))
  140 NEXT
  150 X=0:Y=0
  160 READ MX%,MY%,TX%,TY%
  170 REPEAT
  180 N%=(RND(NT%))
  190 IF RND(1000) < PB(N%) THEN HX=X*T1
(N%)-Y*T2(N%)+T3(N%): HY=X*T4(N%)+Y*T5(N
%)+T6(N%): X=HX: Y=HY ELSE GOTO 180
  200 X%=X*MX%+TX%
  210 Y%=Y*MX%+TY%
  220 PLOT 69,X%,Y%
  230 UNTIL FALSE
  240 END
  250 REM TRANSFORMATION DATA TRANSLATIO
N, ROTATION, SCALING, PROBILITITY
  260 DATA 0, 0, 0, 0, 0, 0.16, 0.2
  270 DATA 0, 1.6, -2.5, -2.5, 0.85, 0.8
5, 0.8
  280 DATA 0, 1.6, 49, 49, 0.3, 0.34, 0.
975
  290 DATA 0, 0.44, 120, -50, 0.3, 0.37,
 0.975
  300 REM MAGNIFICATION FACTORS, TRANSLA
TION FACTORS
  310 DATA 128,128,640,128
```

Get it right!

```
 10 =    0 0   170 = BFBA 2
 20 =    0 0   180 = 34E4 2
 30 =    0 0   190 = 9C79 2
 40 = 6075 5   200 =  1FD A
 50 = B6EF 1   210 = DA9A 5
 60 = 56C8 A   220 = B9A7 5
 70 = D92B 0   230 = 226C A
 80 = A909 2   240 = FD2E 8
 90 = EEAE E   250 =    0 8
100 = DFA8 B   260 = 98BF 2
110 = BC06 6   270 = 1A7A C
120 =  512 C   280 = 9029 F
130 = 907E 5   290 = 4F7F 1
140 = 2C83 3   300 =    0 1
150 = D59C 2   310 = EC50 9
160 = A7A8 C
```

Listing II

```
   10 REM >AFINE6 For 8 bit see text
   20 MODE15
   30 PRINT"Afine Transformation Fractal
 Generator"
   40 PRINT"By Mike Cook"
   50 PRINT"Micro User Sep. 89"
   60 *FX4,1
   70 CM%=63 : REM max number of colours
   80 NTL%=12
   90 S=1
  100 DIM T(NTL%,6),TB%(8),IS%(3)
  110 DIM T1(NTL%),T2(NTL%),T4(NTL%),T5(
NTL%),PB(NTL%)
  120 FOR A=1 TO 7
  130 READ TB%(A)
  140 NEXT
  150 PROC_INIT
  160 REPEAT
  170 PROC_SETUP
  180 CLS:FG=FALSE
  190 FOR A%=1 TO NT%
  200 IF T(A%,6)>0 THEN FG=TRUE
  210 NEXT
  220 IF FG AND NT%>1 THEN PROC_DRAW
  230 CLS
  240 UNTIL FALSE
  250 END
  260 :
  270 DEF PROC_SETUP
  280 PROC_SHOW
  290 TY%=8:TX%=1
  300 REPEAT
  310 PRINT TAB(TB%(TX%),TY%);
  320 A$=GET$
  330 K%=ASC(A$)
  340 IF (ASC(A$)>&2F AND ASC(A$)<&3A) O
R A$="." OR A$="-" THEN PROC_NPRAM
  350 IF K%=136 THEN TX%=TX%-1
  360 IF K%=137 OR K%=13 THEN TX%=TX%+1
  370 IF K%=139 THEN TY%=TY%-1
  380 IF K%=138 THEN TY%=TY%+1
  390 IF TY%<8 THEN TY%=NT%+12
  400 IF TY%=NT%+13 THEN TY%=8
  410 IF TY%=NT%+8 THEN TY%=NT%+12
  420 IF TY%=NT%+11 THEN TY%=NT%+7
  430 IF TX%=8 THEN TX%=1
  440 IF TX%=0 THEN TX%=7
  450 IF TY%=NT%+12 AND TX%=7 THEN TX%=4
  460 IF TY%=NT%+12 AND TX%>4 THEN TX%=1
  470 IF A$="W" THEN NT%=0:TY%=8: PROC_R
ADD
  480 IF A$="N" THEN PROC_RADD
  490 IF A$="Q" THEN CLS:OSCLI("FX4,0"):
END
  500 UNTIL A$="D"
  510 PROC_CONV
  520 ENDPROC
  530 :
  540 DEF PROC_NPRAM
  550 LOCAL N$
  560 N$=""
  570 PRINTSPC(5)
  580 PRINTTAB(TB%(TX%),TY%);A$;
  590 N$=N$+A$
  600 REPEAT
  610 A$=GET$
  620 IF ASC(A$)>&20 THEN PRINTA$;
  630 N$=N$+A$
  640 UNTIL ASC(A$)<&20 OR ASC(A$)>&3F
  650 N$=LEFT$(N$,LEN(N$)-1)
  660 IF TY%<NT%+12 THEN T(TY%-7,TX%-1)=
VAL(N$) ELSE IS%(TX%-1)=VAL(N$)
  670 PROC_SHOW
  680 TX%=TX%+1
  690 ENDPROC
  700 :
  710 DEF PROC_RADD
  720 NT%=NT%+1
  730 IF NT%>NTL% THEN NT%=NTL%
  740 FOR A%=0 TO 6
  750 T(NT%,A%)=0
  760 NEXT
  770 PROC_SHOW
  780 ENDPROC
  790 :
  800 DEF PROC_SHOW
  810 CLS
  820 PRINT"Afine Transformation Fractal
 Generator"
  830 PRINT"By Mike Cook"
  840 PRINTTAB(0,4)"Using ";NT%;" transf
ormation, current values are:-"
  850 PRINT
  860 PRINT SPC(7);"Translation";SPC(4);
"Rotation";SPC(5);"Scaling";SPC(4);"Prob
ility"
  870 PRINT SPC(9);"X";SPC(4);"Y";SPC(8)
;"X";SPC(5);"Y";SPC(5);"X";SPC(5);"Y"
  880 FOR A%=1 TO NT%
  890 PRINT TAB(9);T(A%,0);TAB(14);T(A%,
1);TAB(23);T(A%,2);TAB(29);T(A%,3);TAB(3
5);T(A%,4);TAB(41);T(A%,5);TAB(49);T(A%,
6)
  900 NEXT
  910 PRINT
  920 PRINT"Overall image pramaters:-"
  930 PRINT SPC(7);"Magnifacation   Tran
slation"
  940 PRINT SPC(10);"X";SPC(4);"Y";SPC(8
);"X";SPC(5);"Y"
  950 PRINTTAB(9);IS%(0);TAB(14);IS%(1);
TAB(23);IS%(2);TAB(29);IS%(3)
  960 PRINT
  970 PRINT"Use the cursor to move arrou
nd and type any changes"
  980 PRINT"Press the N key to add a new
 transformation"
  990 PRINT"Press the W key to Wipe all
the transformations"
 1000 PRINT
 1010 PRINT"Press the D key to Draw the
fractal and space bar to end"
 1020 PRINT"Q to Quit"
 1030 ENDPROC
 1040 :
 1050 DEF PROC_INIT
 1060 NT%=4
 1070 FOR A%=1 TO NT%
 1080 FOR B%=0 TO 6
 1090 READ T(A%,B%)
 1100 NEXT:NEXT
 1110 PROC_CONV
 1120 FOR A%=0 TO 3
 1130 READ IS%(A%)
 1140 NEXT
 1150 PB(0)=1000
 1160 ENDPROC
 1170 :
 1180 DEF PROC_CONV
 1190 FOR A%=1 TO NT%
 1200 PB(A%)=T(A%,6)*1000
 1210 T1(A%)=T(A%,4)*COS(RAD(T(A%,2)))
 1220 T2(A%)=T(A%,5)*SIN(RAD(T(A%,3)))
 1230 T4(A%)=T(A%,4)*SIN(RAD(T(A%,2)))
 1240 T5(A%)=T(A%,5)*COS(RAD(T(A%,3)))
 1250 NEXT
 1260 MX%=IS%(0):MY%=IS%(1)
```

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```
 1270 SX%=IS%(2):SY%=IS%(3)
 1280 X=0:Y=0
 1290 ENDPROC
 1300 :
 1310 DEF PROC_DRAW
 1320 REPEAT
 1330 N%=RND(NT%)
 1340 IF RND(1000) < PB(N%) THEN HX=X*T1
(N%)+Y*T2(N%)+T(N%,0): HY=X*T4(N%)+Y*T5(
N%)+T(N%,1):X=HX:Y=HY ELSE GOTO 1330
 1350 X%=X*MX%+SX%
 1360 Y%=Y*MY%+SY%
 1370 C%=POINT(X%,Y%)
 1380 IF C%<CM% THEN GCOL 0,C%+1 TINT
255
 1390 PLOT 69,X%,Y%
 1400 UNTIL INKEY(-99)
 1410 *FX15,0
 1420 ENDPROC
 1430 :
 1440 REM TAB DATA
 1450 DATA 9,14,23,29,35,41,49
 1460 :
 1470 REM TRANSFORMATION DATA TRANSLATIO
N, ROTATION, SCALING, PROBILITITY
 1480 DATA 0, 0, 0, 0, 0, .16, 0.2
 1490 DATA 0, 1.6,-2.5,2.5, 0.85, 0.85,
0.8
 1500 DATA 0, 1.6, 49, -49, 0.3, 0.34, 0
.975
 1510 DATA 0, 0.44, 120, 50, 0.3, 0.37,
0.975
 1520 REM MAGNIFICATION FACTORS, TRANSLA
TION FACTORS
 1530 DATA 128,128,640,128
```

Get it right!

```
  10 =    0 0 | 270 = 6CAA 5 | 530 = 9719 F | 790 = 9719 8 |1050 = 5222 5 |1310 = E46C 4
  20 =   92 2 | 280 =  73C F | 540 = 50E3 2 | 800 =  94B B |1060 =  922 3 |1320 = BFBA 1
  30 = 8C4E 9 | 290 = 744A 8 | 550 = 20A2 D | 810 = 7A16 B |1070 = 14DA 5 |1330 = 91BA F
  40 = FC23 E | 300 = BFBA 4 | 560 = C02F B | 820 = 8C4E E |1080 = 8A75 9 |1340 = DD8A A
  50 = 4069 F | 310 =   17 5 | 570 = DB04 F | 830 = FC23 5 |1090 = 576E 3 |1350 = 846D 5
  60 = E383 E | 320 = 77F2 D | 580 = 1F4C 3 | 840 = F809 6 |1100 = 24BD C |1360 = 1AAA 5
  70 = 9A13 4 | 330 = F0C6 2 | 590 = A96D 9 | 850 = FF3E 0 |1110 = BA1B D |1370 = 5367 5
  80 = 2F58 1 | 340 = CAF8 2 | 600 = BFBA C | 860 = 6D7A 3 |1120 = 12A5 D |1380 = F587 8
  90 = 5225 C | 350 = 864E 1 | 610 = 77F2 4 | 870 = BCC4 D |1130 = F5BA D |1390 = B9A7 8
 100 = 542C E | 360 = B1C4 7 | 620 = 7792 C | 880 = 14DA 0 |1140 = 2C83 D |1400 = 4CF5 2
 110 = 3D43 2 | 370 = 767B 2 | 630 = A96D 5 | 890 = 46F5 5 |1150 = BF4D 4 |1410 = 6C86 8
 120 = 9304 6 | 380 = 99BE 5 | 640 = 50E6 4 | 900 = 2C83 4 |1160 = ED0F A |1420 = ED0F 6
 130 = E70A C | 390 = C5A9 7 | 650 = E764 8 | 910 = FF3E B |1170 = 9719 A |1430 = 9719 0
 140 = 2C83 0 | 400 = C317 7 | 660 = 735C 3 | 920 = 8A26 D |1180 = B46C 1 |1440 =    0 0
 150 = 5C55 A | 410 = 481C 1 | 670 =  73C B | 930 = FD3C F |1190 = 14DA 1 |1450 = F7A0 D
 160 = BFBA F | 420 = FA1A A | 680 = CE7C 3 | 940 = 9E67 E |1200 = 9FDA 1 |1460 = 9719 C
 170 = FA64 F | 430 = 86BC B | 690 = ED0F 4 | 950 = E2CA 1 |1210 = 8A1E D |1470 =    0 C
 180 =  A2E D | 440 = CF85 6 | 700 = 9719 D | 960 = FF3E 9 |1220 = C27D 6 |1480 =  371 B
 190 = 14DA 2 | 450 = 6939 7 | 710 = 1FC6 3 | 970 =  3D0 D |1230 = 63B9 9 |1490 = A695 7
 200 =  B16 5 | 460 = A517 F | 720 = 6E6B 9 | 980 = 1CEE 0 |1240 =  116 D |1500 = 4903 B
 210 = 2C83 C | 470 = 672C 4 | 730 = F341 B | 990 = 74FF 5 |1250 = 2C83 C |1510 = D7D4 9
 220 = 3BE1 8 | 480 = B88C E | 740 = 4200 E |1000 = FF3E B |1260 = 810F 4 |1520 =    0 9
 230 = 7A16 6 | 490 = ED84 6 | 750 = 9F0B 1 |1010 = 996C 9 |1270 = 5D04 8 |1530 = EC50 5
 240 = 226C 8 | 500 = E3FC B | 760 = 2C83 7 |1020 = 3E16 5 |1280 = D59C 6 |
 250 = FD2E A | 510 = BA1B C | 770 =  73C 6 |1030 = ED0F E |1290 = ED0F C |
 260 = 9719 6 | 520 = ED0F 9 | 780 = ED0F B |1040 = 9719 E |1300 = 9719 4 |
```

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OVER the last two months I have been challenging you to write a program which draws a series of random sized circles on the micro screen, ensuring that they did not overlap. Last month I outlined my solution and many of you have already written in with yours. Now I will show you my full listing – but remember this is just one of the many ways the problem can be solved.

First, you might like to take a look at the challenge in the September issue to refresh your memory about the problem in hand, and it's a good idea to read last month's article in conjunction with the listing.

If you've solved the problem in a completely different way we'd like to see it. Send it to Letters, The Micro User, *Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP. We'll give £10 for the best solution that fills the screen with non-overlapping circles.*

All steamed up?

Mike Cook produces a solution to our condensation problem

THE listing shown here is my solution to the poser; let's look at how it works. Lines 10 to 60 acquire the number of circles to draw and dimension the storage arrays accordingly. If you put in too large a number for your micro you will get an *Out of room* error message as the program progresses. If you do, the number of circles you have drawn at that point is the limit for your machine using this routine. Does your own routine allow more?

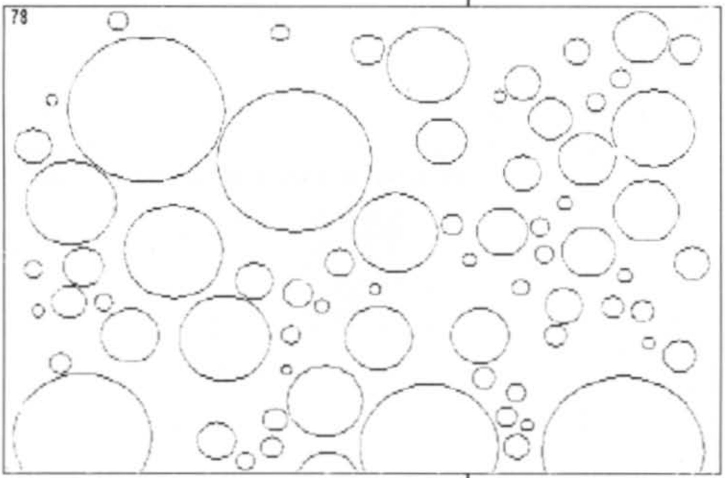
The variable *N%* counts the number of circles you have drawn so far, and not surprisingly it starts off with zero. Lines 90 to 180 generate a random circle and make sure it will fit on the screen. Line 210 draws and stores the circle on the first go, otherwise it goes to the procedure to test to see if it overlaps with any other – this is in lines 240 to 340.

A% is used to count through the array and *LAP%* is a logic variable which is set if a circle overlaps any other. Remember, we basically ask the question, "Is the distance between the centres of the two circles greater than the sum of their radii?" The distance between the centres can be found from *TX%* and *TY%* and line 300 uses Pythagoras to make sure that they do not overlap.

Then four is added to the radius to compensate for the rounding errors when going from the floating point answer to the square root and then to the integer screen co-ordinate. This permits the circles to just touch but not overlap. If you want the circles any further apart simply make this number bigger.

Note that line 320 terminates the search as soon as one circle is found to overlap. If none do the circle is drawn and added to the list.

I found it useful to print the number of circles drawn so far at the top of the screen – line 450. It is surprising how many can be drawn without there appearing to be so many. As expected, the more circles on screen the longer it is before the next one that will fit is found. The overall effect on the screen is most pleasing, but it could be modified in many ways. The first would be to restrict the range of the circle size. This is done by altering the numbers in line 130: The smaller the number in the bracket the smaller is the largest circle, and the larger the constant added the larger is the smallest circle. This has a dramatic effect on the appearance of the screen.



Another modification would be to choose a random spot on the screen and find the largest non-overlapping circle that would fit there. You could do this by gradually increasing the size of the radius until it was found to overlap and then reducing it slightly. But that's another challenge and I will leave it up to you.

Turn to Page 62 ►

◀ From Page 61

```
   10 REM >NO_CIR1
   11 MODE 0
   20 PRINT"Programmers Challange"
   30 PRINT"NONE OVERLAPING CIRCLES"
   31 PRINT"By Mike Cook"
   40 INPUT"Number of circles to draw ",
S
   50 CLS
   60 DIM X%(S),Y%(S),R%(S)
   70 N%=0
   80 REPEAT
   90 REPEAT
  100 REM GENERATE A CANDIDATE CIRCLE
  110 XC%=RND(1280)
  120 YC%=RND(1024)
  130 RC%=RND(200)+8
  140 XMX%=XC%+RC%
  150 XMN%=XC%-RC%
  160 YMX%=YC%+RC%
  170 YMN%=YC%-RC%
  180 UNTIL (YMN%>0 AND XMN%>0) AND (XMX
%<1280 AND YMX%<1024)
  190 REM NOW IT FITS IN THE SCREEN
  200 REM DOES IT INTERSECT WITH ANY OTH
ER
  210 IF N%=0 THEN PROC_Scir ELSE PROC_F
cir
  220 UNTIL N%=S
  230 END
  240 DEF PROC_Fcir
  250 REM SEE IF NEW CIRCLE WILL INTERSE
CT WITH ANY OTHER
  260 A%=0:LAP%=FALSE
  270 REPEAT
  280 TX%=ABS(XC%-X%(A%))
  290 TY%=ABS(YC%-Y%(A%))
  300 IF SQR(TX%^2+TY%^2)<(R%(A%)+RC%+4)
 THEN LAP%=TRUE
  310 A%=A%+1
  320 UNTIL LAP%=TRUE OR A%=N%
  330 IF LAP%=FALSE THEN PROC_Scir
  340 ENDPROC
  350 :
  360 DEF PROC_Scir
  370 REM DRAW THE CIRCLE AND SAVE IT
  380 PROC_Dcircle
  390 X%(N%)=XC%
  400 Y%(N%)=YC%
  410 R%(N%)=RC%
  420 N%=N%+1
  430 ENDPROC
  431 :
  440 DEF PROC_Dcircle
  450 PRINTTAB(0,0);N%
  452 FOR TH=0 TO 360 STEP 10
  453 X=RC%*SIN(RAD(TH))+XC%
  454 Y=RC%*COS(RAD(TH))+YC%
  455 IF TH=0 THEN MOVE X,Y ELSE DRAW X,
Y
  456 NEXT
  500 ENDPROC
```

Get it right!

```
 10 =    0 0 | 170 = 4A88 8 | 350 = 9719 6
 11 = 6075 5 | 180 = B9BB 0 | 360 = A7FB 0
 20 = D555 A | 190 =    0 0 | 370 =    0 0
 30 = 3CE7 1 | 200 =    0 0 | 380 = E3B8 4
 31 = FC23 5 | 210 = F06B 5 | 390 = EEB8 B
 40 = 74DE E | 220 = 6FE4 2 | 400 = B6CD 6
 50 = 7A16 B | 230 = FD2E 1 | 410 = BDB8 4
 60 = D12A D | 240 =   19 8 | 420 = E967 F
 70 = E46A F | 250 =    0 8 | 430 = ED0F C
 80 = BFBA 7 | 260 = 1548 C | 431 = 9719 A
 90 = BFBA A | 270 = BFBA 3 | 440 = 6977 C
100 =    0 A | 280 = 2258 A | 450 = 5356 1
110 = 1963 2 | 290 = EA54 4 | 452 = 54F0 2
120 = 2747 F | 300 = 6B6E 0 | 453 = D6C0 6
130 = FE31 E | 310 = B760 6 | 454 = 6FF7 8
140 = 312C 8 | 320 = CBD7 6 | 455 = 1AD6 3
150 = F19C 2 | 330 = 5E70 B | 456 = 2C83 7
160 = 8A38 E | 340 = ED0F 3 | 500 = ED0F 9
```

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U·P·D·A·T·E

Resources line up to assist teachers

HELP is at hand for teachers who are worried about integrating information technology into their subject areas and fear they may not fulfil government IT requirements in the national curriculum. Aid is offered in the form of a new bulletin, a conference and a series of teaching kits from Resource which took over on the demise of the MEPs. Resource is backed by a consortium of education authorities in the Doncaster, Rotherham and Humberside region.

This year's Resource conference is to be held at Doncaster Racecourse on November 16. Lady Parkes, chairing the Design and Technology Working Party, Richard Dorrance of the National Curriculum Council and Ralph Tabberer, director of 5 to 16 schools at the National Council for Education Technology, are the keynote speakers. Up to 600 delegates and over 50 exhibitors are expected. Attendance fee is £10.

Launched to coincide with the conference will be the first three of Resource's National Curriculum Files, designed to provide teachers with ideas, stimulus materials and support software all presented in a low-text and graphically-based medium. Making up Resource kits, these will include a number of modules which will link together to provide applications on the Archimedes and BBC Master.

First of the three files is The Perfus Project. It is aimed at lower secondary pupils and provides materials for developing a multi-cultural topic within English, personal social development or social studies with pupils put in the position of arriving as aliens on another planet. The Earth in Space is also aimed at lower secondary or junior pupils and addresses the requirements of the science curriculum.

The third file, Moving, is a science pack for the lower end of the primary range. It tackles simple principles of physics relating to the laws of motion, providing teachers with ideas for enabling the children to discover for themselves.

When contacted by *The Micro User*, Resource (0302 340331) had not fixed prices for the files.

The new Resource bulletin provides an overview for schools of information technology requirements in the national curriculum core subjects. It is designed as a help for teachers.

With Christmas nearing, Resource has also catered for teachers who want festive activities for their pupils. Christmas Tales is the next in its Fairy Tales series of simple desktop publishing programs for younger children. Running on all 8 bit BBC micros, it is suitable for the middle to upper primary age range.

Michael Page presents the Archimedes 440 to deputy head Hedley Underwood

School wins Archimedes 440

PADNELL Middle School, Hampshire was the winner in a special prize draw to mark the launch of Acorn's Schools Service. The prize was a top of the range Archimedes 440 which was presented to deputy head teacher Hedley Underwood by communications manager of Acorn Michael Page.

Mr Underwood said: "The 440 is the flagship of the Archimedes range and opens up many new and exciting opportunities for teachers and pupils at Padnell School, particularly in the areas of craft design and technology, music and art.

"It is becoming increasingly important that children leave school with an understanding of how computers can be used effectively in the work environment".

Acorn recently introduced its free school service to help teachers make the most of their school's computer resources. Teachers who have not received enrolment forms can contact Customers Services Department, Acorn Computers, Fulbourne Road, Cherry Hinton, Cambridge, CB1 4JN.

All the news fit to print...

EDUCATIONAL software specialist Sherston Software (0666 840433) will release two new packages for primary and secondary schools in November. Teletype is a news service simulation package. Children watch the news arrive minute by minute with events unfolding as they would in a real newsroom. It can be used to let the

Turn to Page 64 ▶

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children re-live historical events, for teaching modern languages, in drama lessons and whenever teachers want to illustrate a sequence of events.

Teachers can use the disc to create their own files, giving the program flexibility for use with many topics. As usual, Sherston is offering a special introductory price of £25.87 until December 31. After that date the price will be £28.75.

Teletype file packs in French and German will also be available for £17.25 and there are future plans for Spanish and Latin editions, plus a Reuters pack for an actual day's news as it happened. The program runs on all 8 bit BBC Micros.

Second offering from Sherston is The Concept Kids, designed for use with the Concept keyboard. Covering full primary age range, it comes in three packages.

Concept Kate's Keyboard is an adventure with a difference for top infants and lower juniors. They pilot Kate around Concept Kingdom choosing her actions and solving problems to find an elusive keyboard.

Concept Ken's Cartoon is an open ended language and art activity. Pupils can choose from a number of backgrounds and characters to make their own pictures which can then be printed out.

Rounding off the series is Concept Kim's Challenge, a science and problem-solving package. Children must get a ball to the end of an obstacle course by experimenting with such things as its size, angle of projection and thrust.

The whole Concept Kids package costs £21.27 on introductory offer to December 31 and £24.15 after that date. It also runs on all eight bit BBC Micros.

LEA interest in new A3000

LEADING educational software houses have been enthusiastic in their response to the new Acorn A3000. Many have set about modifying existing packages and are also creating innovative new programs.Resource.

Acorn reports that an increasing number of local education authorities are choosing the Archimedes range for the next generation of school computers.

Brian Kennedy of Dudley LEA recently carried out a survey of the Acorn 400 series, the RM Nimbus and machines from Atari, Commodore and Apple in a reappraisal of computers in education. "His immediate conclusions led him to support the Archimedes 410/1 and the BBC Master, but he has been so impressed by the price and performance of the new machine he has now decided to promote the A3000 instead", said Michael Page, communications manager for Acorn.

Wordwise Plus 2

Produced with the co-operation of Computer Concepts, Wordwise Plus 2 (WW+2) is an extension of the top-selling Wordwise Plus.

Unlike products such as Wordaid (Watford), WW+2 is not just another Wordwise add-on. It is a complete word-processing system which offers all the features of Wordwise Plus, and much more besides.

Most Wordwise support packages have several disadvantages. They occupy an extra ROM socket and are often very slow. WW+2 suffers from neither of these problems. For example, WW+2 sorts 200 addresses in about 2 seconds whereas Wordaid takes 45 minutes!

***"WW+2 is superb, including all the essential commands which were omitted from the original"* Acorn User, April 1989.**

Just some of the features include;

- Supplied on a single chip
- Menu-driven file access
- Compatible with existing text files
- Over 12 new CTRL keys (eg String search, delete line)
- Mail merge and label printing
- Print multiple copies of document
- Very fast and versatile data sorting
- Runs all WW+ segment programs (but faster)
- Single key selection of text or segments
- BASIC program editor and segment program utilities
- Upgrades available
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- **Write or 'phone for our free information sheet.**

Remember that with WW+2 you have our 28 day no-quibble money back guarantee. Do you get that with Wordwise Plus?

Prices include VAT, but please allow £1 postage. Make cheques payable to "IFEL". Official orders welcome.

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Upgrade from Wordwise Plus	£37.95
Upgrade from Wordwise	£47.15
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Algebra without the agony

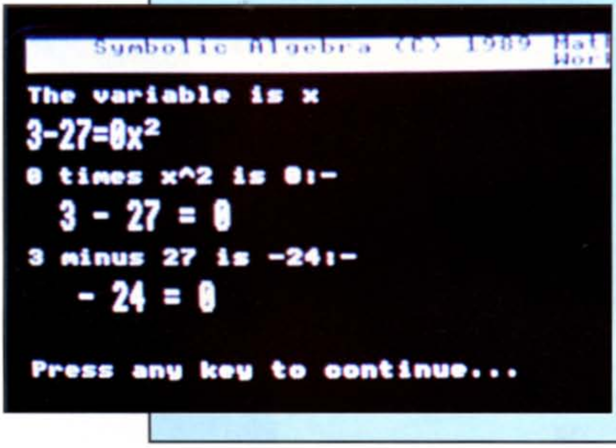
Rog Frost puts a maths package through its paces

Product: Symbolic Algebra
Price: £14.95
Product: Maths Workshop, 95 South Avenue, Worksop, Nottinghamshire S80 2RE.
Tel: 0909 500599

MATHEMATICS is a subject which many Britons love to hate. Any mention of expertise in it seems to imply a certain oddness and most people almost proudly claim ignorance. And if mathematics in general poses a problem the area which must be regarded as most fearsome is algebra. Maths Workshop's Symbolic Algebra program is designed to remove some of the fear from youngsters' hearts.

It contains a set of procedures which can comprehensively solve, factorise, simplify and expand algebraic functions with the ability to plot graphs. A useful handbook comes with the package; while my copy was just a printout perhaps a more stylish version is on the way.

The idea is simple: You enter functions via a word processor style editor which is easy to use and has special keys for some of the more complex functions such as square root. If you use the *to the power of* symbol – ^ – the next entries are placed in a suitable smaller type style. All very neat – even fractions can be entered and are displayed correctly. There is an extra option



```
      Symbolic Algebra (C) 1989 Mat
                                Wor
The variable is x
3-27=0x²
0 times x^2 is 0:-
  3 - 27 = 0
3 minus 27 is -24:-
   - 24 = 0

Press any key to continue...
```

It's all Greek, French, Norwegian ...

Len Nelson gives an overview of a handy languages product

WORD processing is well established within most subjects where text is important, as well as being an important tool for teachers. Euroword now offers modern language teachers with access to any of the Wordwise family the opportunity to join in the fun, as it takes the chore out of generating foreign language accents.

Technically minded people have always been able to generate accents with most dot matrix printers by calling up the appropriate foreign language character set and then accepting a substitute character on the screen.

With Euroword, however, much of the hassle is removed as it attends to the technical part of the job allowing you to concentrate on the French, German, Spanish, Italian, Danish, Swedish or Norwegian. It will even allow you to use the extra accents needed for these on an overprint mode so that you can use them in other languages too. The software will run on

Product: Euroword
Price: £14.90
Supplier: Charm Microsoft, 10 Hall lane, Longton, Preston PR4 5XB.
Tel: 0772 616705

to change the default foreground and background colours.

Having entered your equation or function, a press of Return takes you to the solving section. Here you can select what you wish to do with the function. If you enter a simple one in the editor such as 2y=4, it can solve this and give you a value for *y*. Mind you, you'll have about a 30 second wait while the machine figures it out – timing on a standard Master. A more complex equation like X^2=4 takes very nearly a minute. The program will solve almost any function, but the time increases dramatically with complexity.

When the micro has solved the problem, you are prompted to enter the solution yourself. Unfortunately, the text editor has difficulty here and it's very hard to enter a *to the power of* function – I tended to reach for Escape at this point. This sometimes returns you to the true editor, but at other times the program crashes.

If you get back to the editor you could enter a second, simultaneous equation and the micro can then solve them. The method used is not the one I learned at school nor what seems to be taught these days. Pupils at my school were very confused at this point.

Printed output is possible but is poorly implemented. Words and equations can get split between two lines and this bad presentation reduces the value of the printer option significantly.

The best feature is the graph drawing. Formulae are quickly converted to graphical form and displayed on screen. There doesn't seem to be a printout option, which is a real shame. An option allows a close up look at a section of the graph where there is maximum change.

The support disc, which to be really useful requires a double sided drive or two single drives, enables up to 400 equations to be stored and instantly recalled. This could be a very valuable addition for schools, as separate pages of similar problems can be created. Using the support disc makes no difference to the running of Symbolic Algebra.

Symbolic Calculus

A FULL review of this software was published in the April 1988 issue of *The Micro User* but now Maths Workshop have released an updated version. The general idea is that expressions can be entered via a word processor-style editor and then either differentiated or integrated.

The calculus is carried out in single steps onscreen, with full explanation given. The program would win no prizes for speed, but it is adequate and, for the right users – possibly A level maths students – could be very useful.

The improvements seem to be based mostly on screen layout. A pleasing Mode 7 display is used, with the user having a choice of colour. The whole package seems to work well and I can recommend it to new users. But if you have the original version stick with it.

Rog Frost

Summing up

The package's graph drawing feature redeems the whole lot. The slowness of the factorising and solving is just too bad and I would not use them with pupils. The graphical package, however, is first rate, enabling the most complex graphs to be displayed and I can commend Symbolic Algebra for this part of the package alone. It's a pity it won't do a screen dump.

---

any BBC Micro fitted with Wordwise or Wordwise Plus. It also supports some new embedded commands.

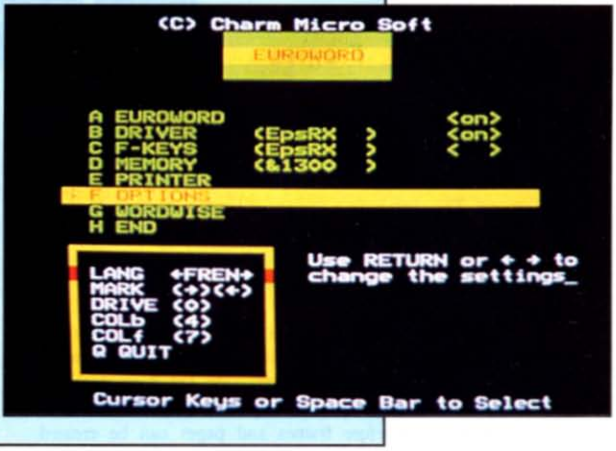
Euroword comes on one disc together with a back-up, a thoughtful touch. One of the initial menu options lets you choose the language you wish to use as well as providing a range of popular dot matrix and daisywheel printer drivers. Help for each option is as easy as pressing P – for prompt – and adjustments are made by rotating the options available. Once the system suits your purposes a further option takes you into Wordwise and the settings chosen are saved for further work. It is at this stage that the usual Wordwise menu is displayed with additional information visible at the bottom of the screen.

The discs come with a read me file with instructions and examples, and together with a 44-page booklet this covers the system and possible problems. If anything there is too much information for the non-technical novice.

The package's major drawback is the loss of workspace – about 20%. Some of the DFS workspace is used by the program, which means that on the BBC B only one file can be opened. Master owners are more fortunate, with up to five open files.

Users of Wordwise Plus will find that the segment programs using PRINT TEXT will not work. An experienced friend managed to write a printer driver segment which converted Euroword character definitions into appropriate Ascii codes for the printer. It is worth noting that Charm will provide a printer driver to your own requirements if you have a non-standard one.

At the price, Euroword is worth considering if you need something compatible with Wordwise and can put up with substitute characters on the screen instead of fully accented ones.



```
            <C> Charm Micro Soft
                  EUROWORD

      A EUROWORD                      <on>
      B DRIVER      <EpsRX   >        <on>
      C F-KEYS      <EpsRX   >        <   >
      D MEMORY      <&1300   >
      E PRINTER
      F OPTIONS
      G WORDWISE
      H END

   LANG  ←FREN→       Use RETURN or ← → to
   MARK  <→><←>       change the settings_
   DRIVE <0>
   COLb  <4>
   COLf  <7>
   Q QUIT

     Cursor Keys or Space Bar to Select
```

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Impression is more than a word processor, it can handle complete documents ranging from whole books, newsletters, or technical articles, to single page advertisements. It can handle all aspects of the final printed result - the text, line graphics, photographs, company logos etc. Yet it can still be used to bash out a single page of text as well as any 'simple' word processor. It is a document processor.

RISCOS

Impression is one of the first products to take full advantage of the new multi-tasking WIMP based operating system for the Archimedes. Because it uses the windowing/pointer/menu facilities the product is simple and intuitive to use - long gone are the days when users had to remember commands, or codes for each operation. Considerable design effort has been expended on making the program simple to learn and simple to use - only five main menu options control everything within Impression.

Impression has been optimised to ensure the fastest possible screen update and this, in conjunction with the very responsive windowing environment, ensures even the most experienced word processor user will gain considerable benefits from this form of control.

Frames

Impression is a frame based page layout system. All objects on the page are held within frames which may be positioned freely anywhere on the page. Frames can contain text or graphics, they may overlap, and may be transparent or have any coloured background. They can have a variety of borders displayed around them and may be arranged in columns to create multi-columned text. Text may be forced to automatically repel around any frame so enabling text to flow around graphics.

A text frame may be linked to any other text frame (even on subsequent pages) so text will automatically flow from frame to frame and page to page. Since Impression has been designed primarily as a word processor, it is important that users can enter text unhindered. Therefore frames and pages can be created automatically as text flows out of a frame, ensuring that while text is being entered you do not have to worry about creating new frames or pages.

Graphics frames may contain any sprite (for example images from Scan-Light) or any Draw file. All graphic frames may have the picture scaled within the frame to any degree. In addition the aspect ratio of pictures can be controlled and even locked to any required value.

Windows

Impression can handle up to 16 documents in memory at any one time. Each document may be viewed in one or more windows. Each individual view may be scaled as required so that, for example, one view may be at 100% while another window shows the same document scaled to 20% so showing a live 'mini' view. This mechanism also allows two different parts of a document to be edited without the need to scroll between them. Impression can display its pages within the window as side-by-side left/right pages, and as vertically arranged pages in a more traditional word processor-like fashion. Not only does this present a far more WYSIWYG display but is also allows instant scrolling to any position in the document. There is no need to specifically turn over the page, thereby overcoming a limitation of traditional DTP systems. Since any window can be scaled to show a reduced view, this system also allows multiple page 'thumb-nail' views.

Spelling checker

Included with Impression is a 60,000 word spelling checker providing some of the most advanced spelling facilities. Check-as-you-type, multiple user dictionaries, ignore dictionary, crossword and anagram solving and an intelligent 'guess' feature are included. Other related dictionaries control automatic abbreviation expansion as you type, and a hyphenation exception dictionary provides precise hyphenation control over and above the normal automatic hyphenation.

arranged on

IMPRESSION
THE DOCUMENT PROCESSOR FOR THE ARCHIMEDES
Acorn

Styles

Like the most powerful word processors on the Mac, Impression supports a system of styles. Rather than having fixed text effects such as bold, underline etc, Impression allows the user to apply any user named style to any part of the text. This style may be defined and re-defined at any time to represent any combination of stylistic effects.

So, for example, one style, perhaps called 'heading' may specify text to be in a Times font, one inch high, in italics and centered. This style may then be applied to any region of text with one menu option (or just one key-press). A traditional word processor would require four separate operations to be applied for each heading (assuming it could do it at all).

Printing

Included are the latest RISCOS printer drivers for Epson compatible 9 and 24 pin printers, LaserJet compatible laser printers and ink-jet printers, and PostScript printers. These printer drivers ensure the output is to the maximum resolution the printer can manage so ensuring the print is to the highest quality possible. In addition Impression supports 'text mode' draft printing so text may be output as fast as possible using the printer's character set. The user therefore has a choice between fast text only printing or high quality text (any font, any size) and graphics printing.

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This advert was designed, laid out and edited on Impression. All logos were created in Draw and imported into Impression frames. The pages were then 'printed' via the PostScript printer drivers to disc. This disc file was then sent directly to a Linotron phototypesetter, which output the final camera ready artwork. The studio photographs were pasted in separately.

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Dashing into the text

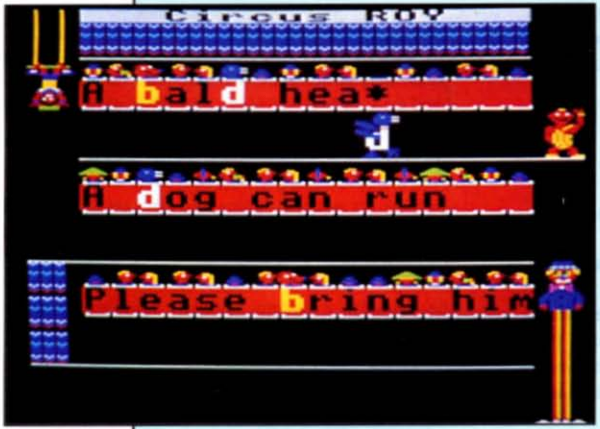
Marshall Anderson looks at a simple but effective educational package

Product: Reading Patterns
Price: £7.00
Supplier: HS Software, 56 Hendrefoilan Avenue, Sketty, Swansea SA2 7NB.
Tel: 0792 204519

READING Patterns consists of two programs that fall into the context-free category so beloved of education advisors at present. The first is a version of Developing Tray and the second is a sequencing program.

Newplay is a fair implementation of the Developing Tray. You are shown a page of text then some or all of it is replaced with dashes. The program then moves to an input mode that allows you a fair degree of control over how you re-construct the original.

The whole text or just a line of it may be re-displayed at any time, points are removed for each peek pupils sneak. There are two input modes – words may be entered beneath the text and each occurrence placed in the text, or a cursor may be moved around and words entered directly over the relevant dashes. A nice feature is the ability to hop between these modes on a single key press.



A bald hea*

d

A dog can run

Please bring him

Once the text is completed a score is given which may be printed as a certificate on any Epson-compatible printer. During the game the contents of the screen may be printed out which let's you continue work away from the micro. The passage may also be printed in its complete form or as a punctuation exercise.

An interesting feature of this program is the ability to use Superior Software's Speech! utility. If it is installed the words entered and, on completion the entire passage, are read out. It is very difficult to make a judgment about this idea. While no one would deny the extreme cleverness of this utility, its suitability must be questionable in an educational context.

The speech generated, when based directly on English text rather than phonemes, can be very dodgy indeed as Speech! is incapable of dealing with the many exceptions in English spelling. Having said that, if you already have it, there's no reason not to try it out and see what you think. A utility with the package copies it to the program disc so it only need be installed once and can be switched on and off directly from the children's screen. Certainly this is the sort of gimmick that will wake up otherwise jaded pupils – at least for a while.

The other main program offered is called **Enterchange**. This is a sequencing program that takes a piece of text and mixes up the lines, the child then rearranging them into their correct order. The package contains several examples to show the sort of thing this can be used for, not just plain text. For instance, it can be used for alphabetical order or sorting numbers into ascending or descending lists.

Any other kind of sequencing could be entered into this end of things, making it extremely useful in all sorts of curricular areas. The children's screen uses a method of movement that at first seems a little eccentric, but they soon learn it and use it with ease. A couple of little extras, like *Show correct line* and a function that marks those lines so far in their correct position, make this a very nice package for children.

Both these programs use the same text input utility for the creation of files, and the package is rather let down in this respect. The input screen works on one line at a time, each ended by a Return, but it cannot be edited and must be loaded into a Repair utility where whole lines must be re-typed.

If you find that the new line is shorter than the old one the text is not re-formatted and if your new line is too long you seem to have to re-type the rest of the passage. Further to that, the menus work in an eccentric, though again consistent, manner, and disc errors seem to hang the whole thing up – these happen frequently as you are not instructed when to change discs.

If you have any sort of micro expertise these problems will slow you down only momentarily, but unfortunately it is just this kind of thing that will cause a setback for those teachers just coming to grips with the machine.

Summing up

If you are confident with micros and your school does not have a copy of Developing Tray then, with the inclusion of Enterchange, this low cost package could be of much use, notwithstanding its drawbacks. It could be more popular in the home as you are less likely to have similar packages, and parents perhaps have more time to devote to making up files. In either environment, with limited aims and a little patience, you could get a lot out of it.

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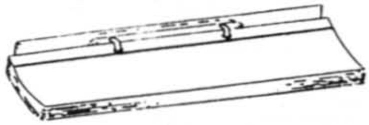

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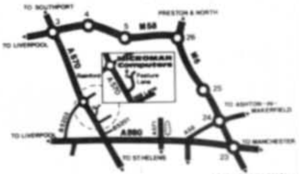

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Whistle up some micro power

Mike Cook puckers up to take hands-off control of his computer

THE BEEB BODY BUILDING COURSE

DO you remember those sonic key rings of a few years ago? You whistled and they beeped so you could find your keys. In fact they were rather annoying – the damn things would be set off from other sounds such as TV and radio. My father had one but it never bothered him: Years of exposure to industrial noise meant that his hearing at the top of the frequency range was so impaired that he just couldn't hear it at all.

It's sad that when you are finally old enough to afford a decent hi-fi system your ears are so shot that you can't appreciate it.

The chips that used to be embedded in those key rings have recently become available and we can use them to do a similar job on our micro and act as a voice activated controller. What I will do is describe how they work and suggest where we can apply them. Finally I will describe a very different fun game we can make with a pair of them.

The UM3763 contains a signal amplifier and frequency detector and is housed in a small 8 pin package. The design is quite novel and instead of using filtering techniques to detect a frequency it relies on digital methods. First of all there is a reference RC oscillator – the R is external and the C is built into the chip. This signal is first divided by 10 to produce the frequency we are looking for.

Then the external signal is amplified and clipped to produce a square wave which is compared with the reference signal. If they are the same an 8 bit divider chain is clocked and serves as our output. So that when the correct frequency is detected the output changes – alternately high and low every 256 cycles of the input frequency.

This sort of output is not what you would expecting – intuitively you would want an output that is in one state when there is no tone and in the other state when one is detected. In fact the information that a tone is present is contained in the edges of the signal rather than at any specific level. However, and as we shall see, it can be turned to our advantage.

The other snag with the UM3763 is the fact that it operates on 3 volts. This is not a problem when operating from batteries, but the micro environment is basically a 5 volt world, so we need some way of losing the excess 2 volts. If we start off with a stabilised 5 volt source we can simply use the forward voltage drop of a PN junction to reduce it. We need three forward drops to do this and I have devised a method using two diodes and a transistor to give a low impedence 3 volt source.

However this presents us with another difficulty – any output needs to be at 5 volts. To feed it into a logic input we will have to boost it. Fortunately there is enough drive capacity in the UM3763 to drive a transistor. Figure I shows the basic arrangement of a test circuit, including the supply and the output buffering. The microphone input can be from any crystal type, as the chip needs only 10mV to drive it.

The output could be fed into a logic input on the user port but the software would have to remember the previous state of the line to know if a signal was being detected or not. A better solution would be to feed it to one of the control lines and arrange it to generate an interrupt. The interrupt service routine would then change the triggering edge, set a flag in memory and reset the system timer. The event routine for this should simply clear the memory flag so it would indicate whether or not a tone was present.

If speed is not important we can simplify the circuitry a little by omitting the output buffering and feeding the chip's output directly into the joystick port. We can feed up to 5 volts into the analogue to digital converters without damage despite the fact that the maximum measuring voltage is 1.8 volts. With the 3 volts from the UM3763 we will simply see the maximum reading.

This is what I have done with the circuit in Figure II. It is a twin tone detector designed to replace the joystick. A tone of 1.8Hz will alter the

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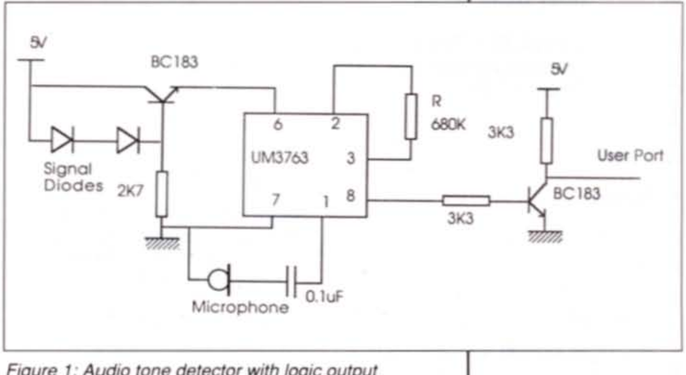

Figure 1: Audio tone detector with logic output

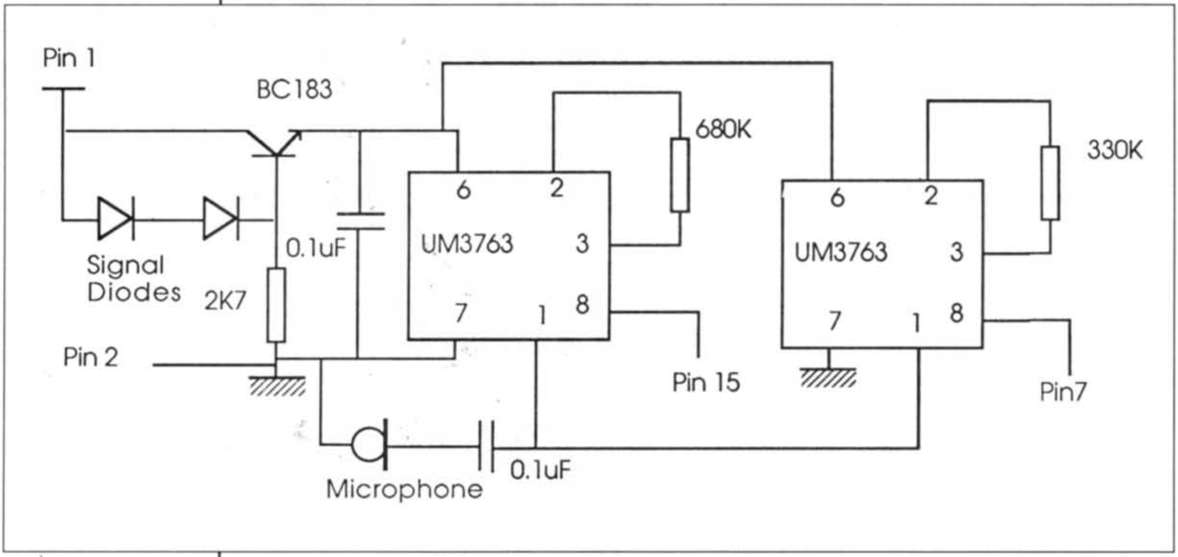

Figure II: Two tone detector connected to the analogue input port

◄ *From Page 75*

left/right joystick and one of 2.4kHz the up/down. I deliberately did not make the tones an octave apart – double the frequency – because you could have run into trouble with false triggering due to harmonics.

The circuit is simple enough to be built on a small piece of veroboard – all the components including 15 way joystick socket and cable are available as Body Build Pack No. 55. It also includes a physical layout of the circuit to make construction easier. You will have to add your own microphone – I have not included this as many people have one lying about and if not they are easily obtainable from any electronic store. A low cost crystal insert will do.

Listing I is basically a test program for the circuit and it allows you to practise your whistling. Pressing the H or V key will let you hear the tone you are aiming at and the screen will show you the current direction. When you hit the correct tone this direction should constantly change at a rate of about once a second. Once you get proficient you can play any joystick game by simply whistling, providing the control does not need to be placed in the middle for any length of time.

This circuit opens the way up to lots of new games and I have presented the outline of one in Listing II. A popular TV programme is *One man and his dog* about sheep dog trials. I went to one over the summer and the sheep dog was found not guilty. The object is simple – to get the sheep into the pen. Sheep, being a little scatter-brained, move about randomly, but when a sheep dog is close they are more likely to move away from it.

You control your sheep dog by whistling and you have a choice of how many sheep you use. The dog may appear to be able to pass through the pen but being a clever dog he automatically jumps over. However, for the dog's sake don't change direction when he is doing so.

Line 180 controls most of the feel of the game. Here the variables are set for the speed of the dog – *DI%* – the speed of the sheep when chased – *SI%* – and the effective distance the dog has influence over the sheep *DL%*. You can change these if you want, but always make sure that the dog can run faster than the sheep. Line 730 determines the amount of random movement for the sheep and this is applied both when the sheep are grazing and when being driven by the dog.

If you run out of puff you can always cheat by playing the game with a joystick. Best of luck and, as Mae West used to say, "If you want anything, just whistle".

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```
   10 MODE 7
   20 PRINTTAB(15,3)
   30 PRINT"Beeb Body Building Course"
   40 PRINT"Whistle training and test"
   50 PRINT"By Mike Cook"
   60 PRINTTAB(0,10);"Current state"
   61 PRINT TAB(0,12);"Horizontal contro
l";
   62 PRINT TAB(0,14);"Vertical control"
;
   70 PRINT TAB(0,18);"Press H or V to h
ear correct tone"
   80 REPEAT
   90 A%=ADVAL(1) DIV &4000
  100 B%=ADVAL(2) DIV &4000
  110 IF A%=3 THEN PRINT TAB(19,12);"LEF
T "
  120 IF A%=0 THEN PRINT TAB(19,12);"RIG
HT"
  130 IF B%=3 THEN PRINT TAB(17,14);"UP
 "
  140 IF B%=0 THEN PRINT TAB(17,14);"DOW
N"
  150 IF INKEY(-100) THEN SOUND 1,-15,20
4,1
  160 IF INKEY(-85) THEN SOUND 1,-15,179
,1
  170 UNTIL FALSE
>*:1.XS
```

Listing I: Routine to test the hardware and train yourself

Get it right!

```
 10 = 1092 2
 20 = E5E2 D
 30 = CCB2 7
 40 = 9281 A
 50 = FC23 1
 60 =  162 4
 61 = A0EE 9
 62 = F764 6
 70 = 1F86 3
 80 = BFBA F
 90 = 5EC1 4
100 =  C2B E
110 = B144 5
120 = 4A58 1
130 = C93A 8
140 = 8310 5
150 = E539 1
160 = 8732 9
170 = 226C A
```

```
   10 MODE 1
   20 PRINT"Beeb Body Building Course"
   30 PRINT"Sheep dog trials"
   40 PRINT"By Mike Cook"
   50 INPUT"How many sheep ",S%
   60 IF S%>9 OR S%<1 THEN GOTO 50
   70 DIM SHEEP(1,S%),SP%(S%)
   80 VDU 23,240,0,7,&85,&FF,&3C,&24,&24
,0
   90 VDU 23,241,0,0,7,7,&FF,&FC,&FC,&FC
  100 VDU 23,242,0,&E0,&A1,&FF,&3C,&24,&
24,0
  110 VDU 23,243,0,0,&E0,&E0,&FF,&3F,&3F
,&3F
  120 VDU 19,0,2,0,0,0
  130 VDU 19,3,0,0,0,0
  140 VDU 19,2,7,0,0,0
  150 REPEAT
  160 VDU5
  170 PROC_PEN
  180 DI%=16:DL%=160:SI%=8
  190 DOGX%=32:DOGY%=32:DP%=240
  200 X%=32:Y%=32:DPS%=240
  210 GCOL 0,3
  220 MOVE X%,Y%
  230 PRINTCHR$(DPS%)
  240 PENNED%=FALSE
  250 REPEAT
  260 A%=ADVAL(1) DIV &4000
  270 B%=ADVAL(2) DIV &4000
  280 IF A%=3 THEN DOGX%=DOGX%-DI%:DP%=2
42
  290 IF A%=0 THEN DOGX%=DOGX%+DI%:DP%=2
40
  300 IF B%=3 THEN DOGY%=DOGY%+DI%
  310 IF B%=0 THEN DOGY%=DOGY%-DI%
  320 IF DOGX%>1255 THEN DOGX%=1255
  330 IF DOGX%<0 THEN DOGX%=0
  340 IF DOGY%<32 THEN DOGY%=32
  350 IF DOGY%>1023 THEN DOGY%=1023
  360 GCOL 3,3
  370 MOVE X%,Y%
  380 PRINTCHR$(DPS%)
  390 X%=DOGX%:Y%=DOGY%:DPS%=DP%
  400 MOVE X%,Y%
  410 PRINTCHR$(DP%)
  420 PROC_SHEEP
  430 UNTIL PENNED%
  440 MOVE 0,90
  450 PRINT"All sheep penned."
  460 PRINT"Press any key to continue"
  470 A$=GET$
  480 UNTIL FALSE
  490 DEF PROC_PEN
  500 CLS
  510 GCOL 0,1
  520 MOVE 400,400
  530 DRAW 400,600
  540 DRAW 800,600
  550 DRAW 800,400
  560 GCOL 3,2
  570 FOR T%=1 TO S%
  580 SP%(T%)=241
  590 SHEEP(0,T%)=RND(1200)
  600 SHEEP(1,T%)=RND(1000)
  610 IF SHEEP(0,T%)>400 AND SHEEP(0,T%)
<800 AND SHEEP(1,T%)>400 AND SHEEP(1,T%)
<600 THEN GOTO 590
  620 MOVE SHEEP(0,T%),SHEEP(1,T%)
  630 PRINTCHR$(SP%(T%))
  640 NEXT
  650 ENDPROC
  660 DEF PROC_SHEEP
  670 GCOL 3,2
  680 PENNED%=TRUE
  690 FOR T%=1 TO S%
  700 MOVE SHEEP(0,T%),SHEEP(1,T%)
  710 PRINTCHR$(SP%(T%))
  720 IF ABS(DOGX%-SHEEP(0,T%))<DL% AND
ABS(DOGY%-SHEEP(1,T%))<DL% THEN SHEEP(0,
T%)=SHEEP(0,T%)-SGN(DOGX%-SHEEP(0,T%))*S
I
  730 SHEEP(0,T%)=SHEEP(0,T%)+RND(9)-4:S
HEEP(1,T%)=SHEEP(1,T%)+RND(9)-4
  740 IF SHEEP(0,T%)<32 THEN SHEEP(0,T%)
=32
  750 IF SHEEP(1,T%)<32 THEN SHEEP(1,T%)
=32
  760 IF SHEEP(0,T%)>1240 THEN SHEEP(0,T
%)=1240
  770 IF SHEEP(1,T%)>1000 THEN SHEEP(1,T
%)=1000
  780 IF SHEEP(0,T%)>400 AND SHEEP(0,T%)
<800 SX%=TRUE ELSE SX%=FALSE
  790 IF SHEEP(1,T%)<400 OR SHEEP(1,T%)>
600 THEN SY%=FALSE:GOTO 840 ELSE SY%=TRU
E
  800 IF SHEEP(0,T%)>364 AND SHEEP(0,T%)
<400 THEN SHEEP(0,T%)=364
  810 IF SHEEP(0,T%)>760 AND SHEEP(0,T%)
<800 THEN SHEEP(0,T%)=760
  820 IF SHEEP(0,T%)>800 AND SHEEP(0,T%)
<812 THEN SHEEP(0,T%)=812
  830 IF SHEEP(0,T%)>400 AND SHEEP(0,T%)
<408 THEN SHEEP(0,T%)=408
  840 IF SHEEP(1,T%)>600 AND SHEEP(1,T%)
<640 AND SX% THEN SHEEP(1,T%)=640
  850 IF SHEEP(1,T%)>588 AND SHEEP(1,T%)
<640 AND SX% THEN SHEEP(1,T%)=588
  860 IF DOGX%-SHEEP(0,T%)<0 THEN SP%(T%
)=241 ELSE SP%(T%)=243
  870 MOVE SHEEP(0,T%),SHEEP(1,T%)
  880 PRINTCHR$(SP%(T%))
  890 IF NOT(SX% AND SY%) THEN PENNED%=F
ALSE
  900 NEXT
  910 ENDPROC
```

Listing II: Sheepdog trials

Get it right!

```
 10 = 7054 4
 20 = CCB2 1
 30 = DB3D D
 40 = FC23 7
 50 = BD86 4
 60 = B8EE A
 70 = 7965 A
 80 = 141D A
 90 = FB39 6
100 = 5E10 D
110 = F824 7
120 =  BCA 1
130 = 466D 1
140 = B40A 1
150 = BFBA C
160 = 667A 6
170 = DFFD 1
180 = 1D95 7
190 = EF3A 0
200 = 908A D
210 = 41D9 2
220 = D0D3 0
230 = 8CF9 5
240 = BABA A
250 = BFBA 9
260 = 5EC1 6
270 =  C2B B
280 = 39FF A
290 = 2D29 0
300 = D479 2
310 = 81E0 5
320 = 19E0 3
330 = EEBF B
340 = 2BEC B
350 = 309A 4
360 = 1889 3
370 = D0D3 8
380 = 8CF9 E
390 = 1D6E 1
400 = D0D3 1
410 = 9E74 7
420 = B4C2 C
430 = A320 5
440 = DE7F E
450 =  DEA B
460 =  31F C
470 = 77F2 3
480 = 226C 9
490 = 4191 2
500 = 7A16 7
510 = 619B 1
520 = 6019 3
530 = D73F 7
540 = 8554 C
550 = EB34 4
560 =  8A8 2
570 = 890C 8
580 = 9605 6
590 = 99FD E
600 = 31F6 A
610 = 5AED 2
620 = D570 4
630 = EB39 F
640 = 2C83 2
650 = ED0F 4
660 = 220C 3
670 =  8A8 E
680 =  9C1 6
690 = 890C 9
700 = D570 4
710 = EB39 A
720 = 3B80 0
730 = 4865 8
740 = 7D7A 8
750 = 7F1D 6
760 = 4753 9
770 = C65F E
780 = A35E 0
790 = 447B 2
800 = AFB7 5
810 = E0D9 9
820 = 43AE C
830 = BA32 1
840 = 70F0 C
850 = FA90 D
860 = 2516 8
870 = D570 9
880 = EB39 8
890 = EAA0 3
900 = 2C83 C
910 = ED0F E
```

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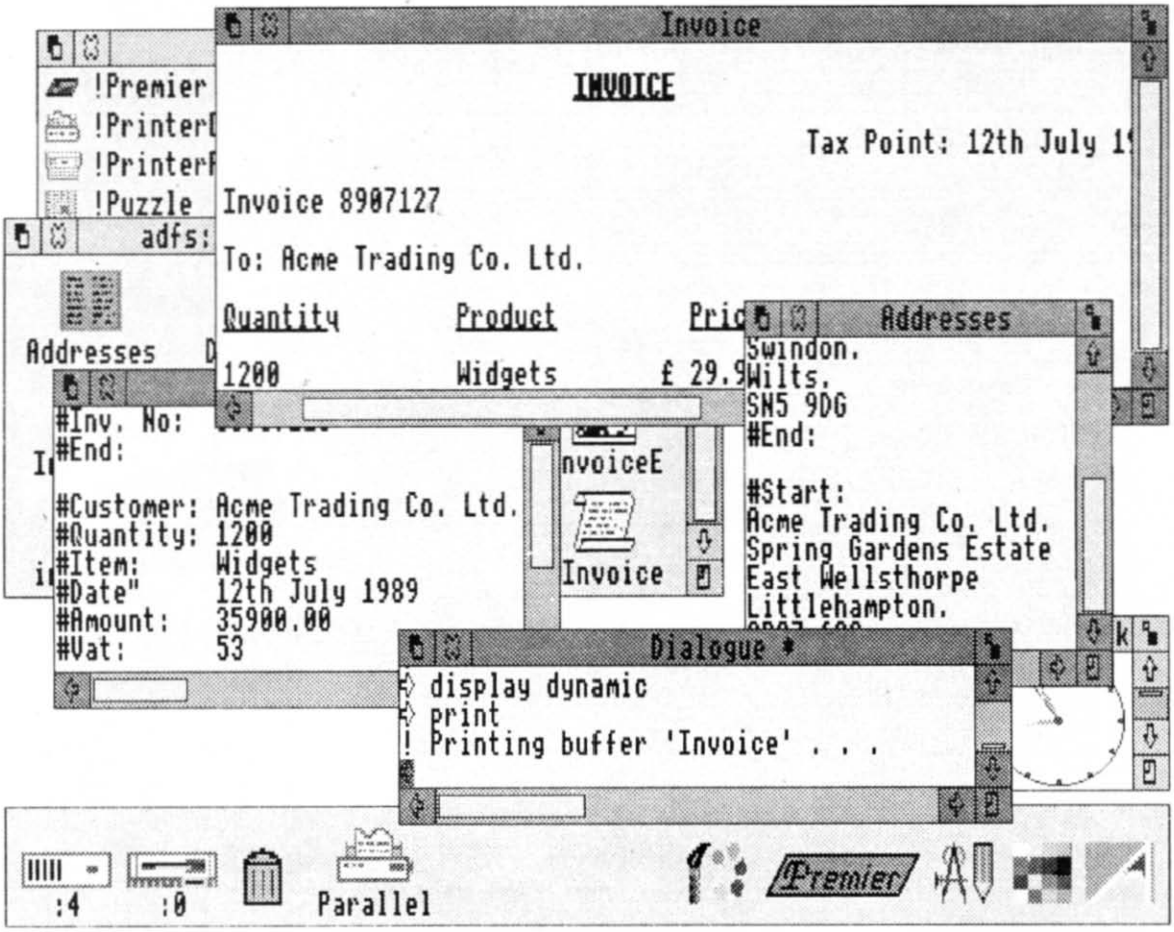

INVOICE

Tax Point: 12th July 1

Invoice 8907127

To: Acme Trading Co. Ltd.

Quantity	Product	Pric
1200	Widgets	£ 29.9

```
#Inv. No:
#End:

#Customer: Acme Trading Co. Ltd.
#Quantity: 1200
#Item:     Widgets
#Date"     12th July 1989
#Amount:   35900.00
#Vat:      53
```

```
Swindon.
Wilts.
SN5 9DG
#End:

#Start:
Acme Trading Co. Ltd.
Spring Gardens Estate
East Wellsthorpe
Littlehampton.
```

```
> display dynamic
> print
! Printing buffer 'Invoice' . . .
```

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For your eyes only

A blank screen can come in handy. Gareth Long explains

THERE may be more than one occasion when you're using your Archimedes for something slightly more private than usual. You may be working on a spreadsheet containing some particularly confidential data, storing personal information or maybe just writing a personal letter. This is all the more likely when working in an office or a crowded classroom on a new project. The problem with a micro is that unlike writing paper – you can't just put it away quickly if someone walks in, and switching off may result in loss of valuable data.

If you suffer from this problem, then ScreenStore, a short relocatable module for the Archimedes 300-400, is for you. Type in the listing carefully, ensure you've made no typing errors using the checksums, save and run it. The module is loaded automatically – in future you can just double-click it from the DeskTop.

The module works very simply: When it is activated you use a single key press to instantly blank the screen and another key to restore it. Another feature allows the module to switch the screen off automatically if the micro is left alone for a predetermined time. Apart from being a good security measure, it also helps to prolong the monitor's life.

The command ScreenStore controls the manual blanking, using the two parameters ON and OFF to activate or disengage it. These can be followed by two optional Ascii parameters which can override the default keys. The second command, AutoStore, also takes ON or OFF plus an optional value specifying the dormant time before screen switch off in fiftieths of a second. In the case of the auto-blanking any key press restores the screen.

The parameters are taken to be decimal by default unless prefixed by & or a base number in the range 2 to 36 followed by the digits, for example all the following equal 10:

```
2_1010
5_20
20_A
```

You may use *Help AutoStore or *Help ScreenStore to gain information on their use and syntax or use any of the commands without a parameter to find out their current status.

The keys are defined by Ascii codes. The default is Page Up for off and Page Down for on, codes &9F and &9E respectively. The predefined time duration for the autostore utility is five minutes – 15000.

The module works by decoding the commands received and storing their data in its workspace. Autostore claims the event vector using interrupt types 2 and 4 – key press and TV sync. Using the sync it counts down from the default number but resets it every time a key is pressed.

Screenstore intercepts the InsV vector to detect a key press and compares it with its key press data. Both utilities can be used at the same time and will survive a soft break without ill effects.

```
   10 REM > $.StoreSRC
   20 REM by Gareth Long
   30 REM (c) The Micro User
   40 CLS:PROCinit:PROCassm
   50 PROCsave:END
   60 DEFPROCinit
   70 Module$="$.Modules.SCRStore"
   80 Version$="1.20"
   90 Date$="(10 Dec 1988)"
  100 buff%=&4000
  110 DIM code% buff%
  120 FOR I%=0 TO buff%-1 STEP 4
  130 code%!I%=0:NEXT
  140 strstatus=0:autstatus=4
  150 key1=8:key2=12
  160 scroff=16:timer=20
  170 current=24:mode=28
  180 ENDPROC
  190 DEFPROCassm
  200 FOR I%=4 TO 6 STEP 2
  210 P%=0:O%=code%:[OPT I%
  220    EQUD    0
  230    EQUD    initialise
  240    EQUD    finalise
  250    EQUD    service
  260    EQUD    titlemess
  270    EQUD    helpmess
  280    EQUD    commandtable
  290 .titlemess
  300    EQUS    "ScreenStore"+CHR$0
  310    ALIGN
  320 .helpmess
  330    EQUS    "Screen Store"+CHR$9+Ve
rsion$+" "+Date$+CHR$0
  340    ALIGN
  350 .initialise
  360    STMFD   r13!,{r0-r6,r14}
  370    LDR     r0,[r12]
  380    CMP     r0,#&00
  390    LDRNE   r12,[r12]
  400    BNE     restart
  410    MOV     r0,#&06
  420    MOV     r1,#&20
  430    MOV     r3,#&FF
  440    SWI     "XOS_Module"
  450    LDMVSFD r13!,{r0-r6,r14}
  460    ADRVS   r0,initerror
  470    ORRVSS  pc,r14,#&10000000
  480    STR     r2,[r12]
  490    LDR     r12,[r12]
  500    MOV     r0,#&00
  510    STR     r0,[r12,#strstatus]
  520    STR     r0,[r12,#autstatus]
  530    STR     r0,[r12,#scroff]
  540    STR     r0,[r12,#current]
  550    MOV     r0,#&3A00
  560    ADD     r0,r0,#&98
  570    STR     r0,[r12,#timer]
  580    MOV     r0,#&9F
  590    STR     r0,[r12,#key1]
  600    MOV     r0,#&9E
  610    STR     r0,[r12,#key2]
  620    MOV     r0,#&87
  630    SWI     "OS_Byte"
  640    STR     r2,[r12,#mode]
  650    LDMFD   r13!,{r0-r6,pc}
  660 .restart
  670    LDR     r0,[r12,#strstatus]
  680    CMP     r0,#&00
  690    MOVNE   r0,#&14
  700    ADRNE   r1,screenstore
  710    MOVNE   r2,r12
  720    SWINE   "OS_Claim"
  730    MOVNE   r0,#&0E
  740    MOVNE   r1,#&04
  750    SWINE   "OS_Byte"
  760    MOVNE   r1,#&02
  770    SWINE   "OS_Byte"
  780    LDR     r0,[r12,#autstatus]
  790    CMP     r0,#&00
```

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```
 800     MOVNE   r0,#&10
 810     ADRNE   r1,autostore
 820     MOVNE   r2,r12
 830     SWINE   "OS_Claim"
 840     LDMFD   r13!,{r0-r6,pc}
 850 .finalise
 860     STMFD   r13!,{r0-r6,r14}
 870     LDR     r12,[r12]
 880     LDR     r0,[r12,#strstatus]
 890     CMP     r0,#&00
 900     MOVNE   r0,#&14
 910     ADRNE   r1,screenstore
 920     MOVNE   r2,r12
 930     SWINE   "OS_Release"
 940     MOVNE   r0,#&0D
 950     MOVNE   r1,#&04
 960     SWINE   "OS_Byte"
 970     MOVNE   r1,#&02
 980     SWINE   "OS_Byte"
 990     LDR     r0,[r12,#autstatus]
1000     CMP     r0,#&00
1010     MOVNE   r0,#&10
1020     ADRNE   r1,autostore
1030     MOVNE   r2,r12
1040     SWINE   "OS_Release"
1050     LDMFD   r13!,{r0-r6,pc}
1060 .service
1070     STMFD   r13!,{r0-r6,r14}
1080     LDR     r12,[r12]
1090     CMP     r1,#&46
1100     BNE     checkreset
1110     MOV     r0,#&87
1120     SWI     "OS_Byte"
1130     STR     r2,[r12,#mode]
1140     MOV     r0,#&00
1150     STR     r0,[r12,#scroff]
1160     LDMFD   r13!,{r0-r6,pc}
1170 .checkreset
1180     CMP     r1,#&27
1190     BEQ     restart
1200     LDMFD   r13!,{r0-r6,pc}
1210 .strdecode
1220     STMFD   r13!,{r14}
1230     LDR     r12,[r12]
1240     CMP     r1,#&00
1250     BEQ     strs
1260     BL      checkon
1270     BVS     strerror
1280     MOV     r5,r0
1290     MOV     r6,r1
1300     LDR     r4,[r12,#strstatus]
1310     STR     r3,[r12,#strstatus]
1320     CMP     r3,#&00
1330     CMPEQ   r3,r4
1340     LDMEQFD r13!,{pc}
1350     CMP     r3,#&00
1360     STREQ   r3,[r12,#strstatus]
1370     MOVEQ   r0,#&14
1380     ADREQ   r1,screenstore
1390     MOVEQ   r2,r12
1400     SWIEQ   "OS_Release"
1410     LDMEQFD r13!,{pc}
1420     CMP     r3,r4
1430     STRNE   r3,[r12,#strstatus]
1440     MOVNE   r0,#&14
1450     ADRNE   r1,screenstore
1460     MOVNE   r2,r12
1470     SWINE   "OS_Claim"
1480     CMP     r6,#&01
1490     LDMEQFD r13!,{pc}
1500     CMP     r6,#&03
1510     BNE     strerror
1520     MOV     r1,r5
1530     ADD     r1,r1,#&01
1540     MOV     r0,#&C000000A
1550     SWI     "OS_ReadUnsigned"
1560     STR     r2,[r12,#key1]
1570     ADD     r1,r1,#&01
1580     MOV     r0,#&C000000A
1590     SWI     "OS_ReadUnsigned"
1600     STR     r2,[r12,#key2]
1610     LDMFD   r13!,{pc}
1620 .strerror
1630     ADR     r0,strerrorm
1640     LDMFD   r13!,{r14}
1650     ORRS    pc,r14,#&10000000
1660 .auterror
1670     ADR     r0,auterrorm
1680     LDMFD   r13!,{r14}
1690     ORRS    pc,r14,#&10000000
1700 .strs
1710     ADR     r0,strsm
1720     SWI     "OS_Write0"
1730     LDR     r0,[r12,#strstatus]
1740     CMP     r0,#&00
1750     ADREQ   r0,off
1760     ADRNE   r0,on
1770     SWI     "OS_Write0"
1780     LDMFD   r13!,{pc}
1790 .auts
1800     ADR     r0,autsm
1810     SWI     "OS_Write0"
1820     LDR     r0,[r12,#autstatus]
1830     CMP     r0,#&00
1840     ADREQ   r0,off
1850     ADRNE   r0,on
1860     SWI     "OS_Write0"
1870     LDMFD   r13!,{pc}
1880 .checkon
1890     LDRB    r2,[r0],#&01
1900     AND     r2,r2,#&DF
1910     CMP     r2,#ASC"O"
1920     ORRNES  pc,r14,#&10000000
1930     LDRB    r2,[r0],#&01
1940     AND     r2,r2,#&DF
1950     CMP     r2,#ASC"N"
1960     MOVEQ   r3,#&01
1970     MOVEQ   pc,r14
1980     CMP     r2,#ASC"F"
1990     ADDEQ   r0,r0,#&01
2000     MOVEQ   r3,#&00
2010     MOVEQ   pc,r14
2020     ORRS    pc,r14,#&10000000
2030 .autdecode
2040     STMFD   r13!,{r14}
2050     LDR     r12,[r12]
2060     CMP     r1,#&00
2070     BEQ     auts
2080     BL      checkon
2090     BVS     auterror
2100     MOV     r5,r0
2110     MOV     r6,r1
2120     LDR     r4,[r12,#autstatus]
2130     STR     r3,[r12,#autstatus]
2140     CMP     r3,#&00
2150     CMPEQ   r3,r4
2160     LDMEQFD r13!,{pc}
2170     CMP     r3,#&00
2180     STREQ   r3,[r12,#autstatus]
2190     MOVEQ   r0,#&10
2200     ADREQ   r1,autostore
2210     MOVEQ   r2,r12
2220     SWIEQ   "OS_Release"
2230     MOVEQ   r0,#&0D
2240     MOVEQ   r1,#&04
2250     SWIEQ   "OS_Byte"
2260     MOVEQ   r1,#&02
2270     SWIEQ   "OS_Byte"
2280     LDMEQFD r13!,{pc}
2290     CMP     r3,r4
2300     STRNE   r3,[r12,#autstatus]
2310     MOVNE   r0,#&10
2320     ADRNE   r1,autostore
2330     MOVNE   r2,r12
2340     SWINE   "OS_Claim"
2350     MOVNE   r0,#&0E
2360     MOVNE   r1,#&04
2370     SWINE   "OS_Byte"
2380     MOVNE   r1,#&02
2390     SWINE   "OS_Byte"
2400     CMP     r6,#&01
2410     LDMEQFD r13!,{pc}
2420     CMP     r6,#&02
2430     BNE     auterror
2440     MOV     r1,r5
2450     ADD     r1,r1,#&01
2460     MOV     r0,#&8000000A
2470     SWI     "OS_ReadUnsigned"
2480     STR     r2,[r12,#timer]
2490     LDMFD   r13!,{pc}
2500 .screenstore
2510     STMFD   r13!,{r0-r6,r14}
2520     CMP     r1,#&00
2530     LDMNEFD r13!,{r0-r6,pc}
2540     LDR     r1,[r12,#key1]
2550     CMP     r0,r1
2560     BLEQ    screenoff
2570     LDMEQFD r13!,{r0-r6,r12}
2580     LDMEQFD r13!,{pc}
2590     LDR     r1,[r12,#key2]
2600     CMP     r0,r1
2610     BLEQ    screenon
2620     LDMEQFD r13!,{r0-r6,r12}
2630     LDMEQFD r13!,{pc}
2640     LDMFD   r13!,{r0-r6,r14}
2650 .autostore
2660     STMFD   r13!,{r0-r6,r14}
2670     CMP     r0,#&04
2680     BNE     iskeypressed
2690     LDR     r0,[r12,#current]
2700     ADD     r0,r0,#&01
2710     STR     r0,[r12,#current]
2720     LDR     r1,[r12,#timer]
2730     CMP     r0,r1
2740     BLEQ    screenoff
2750     LDMFD   r13!,{r0-r6,pc}
2760 .iskeypressed
2770     CMP     r0,#&02
2780     MOVEQ   r0,#&00
2790     STREQ   r0,[r12,#current]
2800     LDREQ   r0,[r12,#scroff]
2810     CMPEQ   r0,#&01
2820     BLEQ    screenon
2830     LDMFD   r13!,{r0-r6,pc}
2840 .screenon
2850     MOV     r0,#&00
2860     STR     r0,[r12,#scroff]
2870     LDR     r0,[r12,#mode]
2880     ADR     r1,VIDCBase
2890     LDR     r1,[r1,r0,LSL#2]
2900     MOV     r5,pc
2910     ORR     r4,r5,#&03
2920     TEQP    r4,#&00
2930     MOVNV   r0,r0
2940     STMFD   r13!,{r14}
2950     MOV     r0,#&03400000
2960     STR     r1,[r0]
2970     LDMFD   r13!,{r14}
2980     TEQP    r5,#&00
2990     MOVNV   r0,r0
3000     MOV     pc,r14
3010 .screenoff
3020     MOV     r0,#&01
```

```
3030     STR      r0,[r12,#scroff]
3040     MOV      r1,#&94000000
3050     MOV      r5,pc
3060     ORR      r4,r5,#&03
3070     TEQP     r4,#&00
3080     MOVNV    r0,r0
3090     STMFD    r13!,{r14}
3100     MOV      r0,#&03400000
3110     STR      r1,[r0]
3120     LDMFD    r13!,{r14}
3130     TEQP     r5,#&00
3140     MOVNV    r0,r0
3150     MOV      pc,r14
3160 .initerror
3170     EQUD     &28700
3180     EQUS     "ScreenStore unable to
claim required workspace"+CHR$0
3190     ALIGN
3200 .commandtable
3210     EQUS     "Store"+CHR$0
3220     ALIGN
3230     EQUD     0
3240     EQUD     0
3250     EQUD     0
3260     EQUD     help
3270     EQUS     "ScreenStore"+CHR$0
3280     ALIGN
3290     EQUD     strdecode
3300     EQUD     &00030000
3310     EQUD     strsyntax
3320     EQUD     strhelp
3330     EQUS     "AutoStore"+CHR$0
3340     ALIGN
3350     EQUD     autdecode
3360     EQUD     &00020000
3370     EQUD     autsyntax
3380     EQUD     authelp
3390     EQUD     0
3400 .strerrorm
3410     EQUD     &28701
3420 .strsyntax
3430     EQUS     "Syntax: *ScreenStore [
```

Turn to Page 82 ▶

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 =  33B B
  50 = 758D 1
  60 = 344C 9
  70 = 1171 6
  80 =  A34 1
  90 = 3567 6
 100 = 5FE7 1
 110 = 44DC 2
 120 = B05E 2
 130 = 406F 3
 140 = 9F65 0
 150 = 4446 E
 160 = 52DA B
 170 = AD92 A
 180 = ED0F 2
 190 = DF1D B
 200 = B1F1 E
 210 = D6B4 E
 220 = D2AA D
 230 = 6DC5 B
 240 = 8BFB B
 250 =  120 4
 260 = B063 1
 270 = 13E8 5
 280 = B0C9 F
 290 = CB9A B
 300 = 1077 6
 310 = 24FA 0
 320 = C718 7
 330 = B99B 4
 340 = 24FA F
 350 = 5B39 5
 360 = 6C3F B
 370 = D42B 8
 380 =  1B8 9
 390 = 929A 8
 400 = E806 2
 410 = E9F9 4
 420 = AAFD E
 430 = FB71 8
 440 = FF19 2
 450 = E784 E
 460 = A1E9 C
 470 = 4FA9 E
 480 = A052 A
 490 = F390 9
 500 = 893F 2
 510 = 197D F
 520 = 3889 7
 530 = A89C C
 540 = 2373 5
 550 = 219E 7
 560 = 9254 2
 570 = 8E83 B
 580 = 2DF6 5
 590 = 1666 3
 600 = 1D95 E
 610 = 4335 9
 620 = 7071 8
 630 = A78B 3
 640 = FAC7 3
 650 = CECC 0
 660 = 9A41 0
 670 = F964 5
 680 =  1B8 2
 690 = 3E5D 6
 700 = 4ACE A
 710 = 410B 4
 720 = 9176 3
 730 = 63DA C
 740 = 48CC 9
 750 = C681 F
 760 = 280A A
 770 = C681 D
 780 = D890 8
 790 =  1B8 1
 800 = 7ED9 D
 810 = 3D3E 8
 820 = 410B 6
 830 = 9176 B
 840 = CECC 6
 850 = 5F0B D
 860 = 6C3F 8
 870 = F390 6
 880 = F964 E
 890 =  1B8 8
 900 = 3E5D 3
 910 = 4ACE 1
 920 = 410B 9
 930 = 777B 4
 940 = 73FB C
 950 = 48CC C
 960 = C681 7
 970 = 280A 0
 980 = C681 3
 990 = D890 C
1000 =  1B8 0
1010 = 7ED9 0
1020 = 3D3E 6
1030 = 410B 7
1040 = 777B 8
1050 = CECC 1
1060 = FEEA 6
1070 = 6C3F 9
1080 = F390 B
1090 = E81A 4
1100 = 3513 9
1110 = 7071 9
1120 = A78B 3
1130 = FAC7 F
1140 = 893F 5
1150 = A89C 6
1160 = CECC A
1170 = 1720 A
1180 = 529D 7
1190 = 9DD7 8
1200 = CECC 1
1210 = 300E 2
1220 = E86B 0
1230 = F390 D
1240 = 4418 5
1250 = EDC8 8
1260 = 6A2B E
1270 = FC3C E
1280 = E3FA E
1290 = 6807 1
1300 =  9C3 8
1310 = 190F E
1320 = CF58 A
1330 = 3E57 7
1340 = BD53 C
1350 = CF58 5
1360 = 9782 7
1370 = B313 8
1380 = AAA8 C
1390 = C777 0
1400 = 6295 D
1410 = BD53 6
1420 = F7C8 9
1430 = D2C5 3
1440 = 3E5D E
1450 = 4ACE 1
1460 = 410B 0
1470 = 9176 B
1480 = 9C78 8
1490 = BD53 E
1500 = BC3A 4
1510 = 5863 4
1520 = 79AE B
1530 = 1766 0
1540 = 1AF2 8
1550 = 51DC 5
1560 = 9CA0 9
1570 = 1766 0
1580 = 1AF2 3
1590 = 51DC 2
1600 = C9F3 4
1610 = 61BC F
1620 = 41B6 2
1630 = 5F4A F
1640 =  52F 1
1650 = 2D46 F
1660 = C624 1
1670 = 2C25 9
1680 =  52F A
1690 = 2D46 A
1700 = 3AB2 E
1710 = 8C0B 2
1720 = F8CF 4
1730 = F964 2
1740 =  1B8 3
1750 = B5D1 6
1760 = 2D26 C
1770 = F8CF 1
1780 = 61BC B
1790 = 51EB 8
1800 =  8C6 B
1810 = F8CF B
1820 = D890 4
1830 =  1B8 D
1840 = B5D1 5
1850 = 2D26 3
1860 = F8CF 7
1870 = 61BC B
1880 = D9D8 9
1890 = FF0A 2
1900 =  A86 F
1910 = 7EE3 0
1920 = FEF7 6
1930 = FF0A F
1940 =  A86 7
1950 = 4DD2 F
1960 = 1E67 2
1970 = 9392 F
1980 = C47B 8
1990 = 3050 E
2000 =  E46 8
2010 = 9392 0
2020 = 2D46 F
2030 = 4361 3
2040 = E86B B
2050 = F390 F
2060 = 4418 6
2070 = 8691 F
2080 = 6A2B 7
2090 = 7BAE 0
2100 = E3FA 7
2110 = 6807 6
2120 = 2837 C
2130 = 38FB 0
2140 = CF58 6
2150 = 3E57 8
2160 = BD53 D
2170 = CF58 A
2180 = B676 0
2190 = F397 D
2200 = 28D0 9
2210 = C777 4
2220 = 6295 9
2230 = FEB5 E
2240 = C582 3
2250 = B350 8
2260 = A544 1
2270 = B350 1
2280 = BD53 7
2290 = F7C8 D
2300 = F331 3
2310 = 7ED9 B
2320 = 3D3E 5
2330 = 410B 8
2340 = 9176 4
2350 = 63DA E
2360 = 48CC F
2370 = C681 5
2380 = 280A B
2390 = C681 D
2400 = 9C78 7
2410 = BD53 A
2420 = AC1B 5
2430 = DFF1 9
2440 = 79AE A
2450 = 1766 9
2460 = 7C51 1
2470 = 51DC 8
2480 = 7841 3
2490 = 61BC 6
2500 = 6488 8
2510 = 6C3F 9
2520 = 4418 3
2530 = A440 D
2540 = 2F04 1
2550 = 3CB1 4
2560 = FD12 6
2570 = C6B2 4
2580 = BD53 2
2590 = 7A57 F
2600 = 3CB1 4
2610 = B0DF D
2620 = C6B2 0
2630 = BD53 5
2640 = 312A 0
2650 = AA43 7
2660 = 6C3F D
2670 = 413C 9
2680 = 81FD E
2690 = BD2B E
2700 = B9E5 D
2710 = 2373 2
2720 = 4BF9 3
2730 = 3CB1 6
2740 = FD12 F
2750 = CECC F
2760 = E749 F
2770 = 21FA 4
2780 = C0A6 6
2790 = 1BEB 9
2800 = 6422 4
2810 = CF03 D
2820 = B0DF 2
2830 = CECC 6
2840 = C0BC C
2850 = 893F B
2860 = A89C 1
2870 =  C00 6
2880 = FDA4 4
2890 = D6A2 C
2900 = EF0E 5
2910 = 265A 6
2920 = 1BBC A
2930 = DC0F C
2940 = E86B 5
2950 = D21E 3
2960 = 2E1A C
2970 =  52F 0
2980 = 5E1C 3
2990 = DC0F 0
3000 = 215C 1
3010 = E085 6
3020 = 991E 0
3030 = A89C 9
3040 = 9787 A
3050 = EF0E A
3060 = 265A 4
3070 = 1BBC 5
3080 = DC0F C
3090 = E86B B
3100 = D21E 5
3110 = 2E1A 4
3120 =  52F F
3130 = 5E1C B
3140 = DC0F F
3150 = 215C 9
3160 = 947D 8
3170 = F46D 2
3180 = C5D1 B
3190 = 24FA 7
3200 = 3169 3
3210 = BFD3 0
3220 = 24FA 4
3230 = D2AA 9
3240 = D2AA 6
3250 = D2AA 4
3260 = 49F2 4
3270 = 1077 9
3280 = 24FA 7
3290 = 4BF7 2
3300 = 8E1F 3
3310 = A03E 8
3320 = C032 4
3330 = 5352 F
3340 = 24FA 9
3350 = 3898 B
3360 = 244E E
3370 = D351 3
3380 = 1F8F 0
3390 = D2AA 6
3400 = 53EE D
3410 = E44C 4
3420 = DBC7 4
3430 = 234D 4
3440 = 24FA B
3450 = 9812 5
3460 = D64F 8
3470 = 24FA C
3480 = 2081 1
3490 = D42F E
3500 = A8A8 6
3510 =  15C 3
3520 = 24FA 0
3530 = 1CDF 4
3540 = B545 E
3550 = 24FA B
3560 =  BBB 2
3570 = 7030 F
3580 = 24FA 4
3590 = 8FA2 8
3600 = 38B0 4
3610 = 24FA 5
3620 = 2400 D
3630 = 24FA 0
3640 = E045 D
3650 = A43C 9
3660 = 36F7 4
3670 = 3FE8 4
3680 =  15C A
3690 = 24FA 2
3700 = 5B46 3
3710 = 3C86 5
3720 = 177D E
3730 = 24FA 0
3740 = 3FF8 8
3750 = 5ECF 9
3760 = 360F E
3770 = F891 1
3780 = 234D A
3790 = 24FA 4
3800 = 953B E
3810 = BD94 A
3820 = 74C8 E
3830 = 4A94 D
3840 = 7A2C 7
3850 = F19F 6
3860 = A1ED F
3870 = 61B5 6
3880 = ED0F 4
3890 =    0 4
3900 = 11FF A
3910 =  B2C C
3920 = 11FF 9
3930 = B69F 5
3940 = 11FF A
3950 =  B2C 9
3960 = 11FF 5
3970 = AC4C B
3980 = 4EF1 6
3990 = 845B 4
4000 = 845B C
4010 = 4960 6
4020 = 13A1 1
```

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```
<ON|OFF> [<key1> <key2>]]"+CHR$0
 3440     ALIGN
 3450 .strsm
 3460     EQUS    "The ScreenStore utilit
y is currently "+CHR$0
 3470     ALIGN
 3480 .auterrorm
 3490     EQUD    &28702
 3500 .autsyntax
 3510     EQUS    "Syntax: *AutoStore [<O
N|OFF> [<time duration>]]"+CHR$0
 3520     ALIGN
 3530 .autsm
 3540     EQUS    "The AutoStore utility
is currently "+CHR$0
 3550     ALIGN
 3560 .on
 3570     EQUS    "on."+CHR$10+CHR$13+CHR
$0
 3580     ALIGN
 3590 .off
 3600     EQUS    "off."+CHR$10+CHR$13+CH
R$0
 3610     ALIGN
 3620     FNdata
 3630     ALIGN
 3640 .authelp
 3650     EQUS    "*AutoStore switches th
e AutoStore system on or off."+CHR$10+CH
R$13
 3660     EQUS    "*AutoStore can take an
 optional time duration (in 50ths/sec) t
o determine the length of time before th
e screen is stored. The default is 5 min
utes."+CHR$10+CHR$13
 3670     EQUS    "*AutoStore without a p
arameter reflects the current state."+CH
R$10+CHR$13
 3680     EQUS    "Syntax: *AutoStore [<O
N|OFF> [<time duration>]]"+CHR$0
 3690     ALIGN
 3700 .help
 3710     EQUS    "The ScreenStore system
 allows the screen to be hidden and rest
ored by a keypress."+CHR$10+CHR$13
 3720     EQUS    "The screen may also be
 stored after a time duration to prevent
 data being read by unauthorised persons
 if the computer is left unattended for
long periods of time."+CHR$0
 3730     ALIGN
 3740 .strhelp
 3750     EQUS    "*ScreenStore switches
the ScreenStore system on or off."+CHR$1
0+CHR$13
 3760     EQUS    "*ScreenStore can take
two ASCII keycodes to allow keys to be p
rogrammed from the default to switch the
 screen off or on respectively. The defa
ult is Page Up and Page Down."+CHR$10+CH
R$13
 3770     EQUS    "*ScreenStore without a
 parameter refects the current state."+C
HR$10+CHR$13
 3780     EQUS    "Syntax: *ScreenStore [
<ON|OFF> [<key1> <key2>]]"+CHR$0
 3790     ALIGN
 3800 ]:NEXT:ENDPROC
 3810 DEFFNdata:[OPT I%:.VIDCBase:]
 3820 RESTORE:FORJ%=0TO24:READ K%
 3830 [OPT I%:EQUD K%:]:NEXT:=I%
 3840 DEFPROCsave
 3850 OSCLI"Save "+Module$+" "+STR$~code
%+"+"+STR$~P%
 3860 OSCLI"SetType "+Module$+" Module"
 3870 OSCLI"KEY1 *RMLoad "+Module$+"|M"
 3880 ENDPROC
 3890 REM VIDC Mode Data (Modes 0-24)
 3900 DATA &94770000,&943B8000
 3910 DATA &943B8000,&94770000
 3920 DATA &94770000,&943B8000
 3930 DATA &943B8000,&943B8000
 3940 DATA &94770000,&943B8000
 3950 DATA &943B8000,&94770000
 3960 DATA &94770000,&943B8000
 3970 DATA &94770000,&94770000
 3980 DATA &94B34000,&94B34000
 3990 DATA &94704000,&94704000
 4000 DATA &94704000,&94704000
 4010 DATA &94348000,&94348000
 4020 DATA &94348000
```

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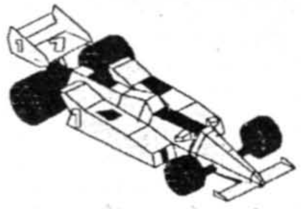

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We are once again able to offer 0% finance for the purchase of an Archimedes Micro and some peripherals. For further details please write in or telephone
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With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

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● 4HD40 – 40Meg Hard Disc for 410	£299
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● A3000 20 Meg Hard Disc	£TBA
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Z88 Portable Micro

Watford Electronics are the largest Z88 Dealer in the UK

Only: £195 (Carr £4)

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

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512K RAM Pack	**£169**
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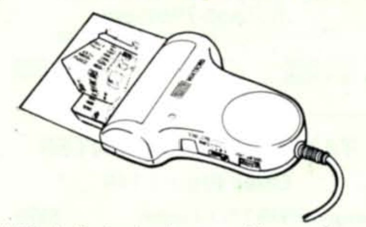
● Z88 Mains Adaptor	**£8.65**	● Z88 Modem	**£145**

NEW

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system. The package includes the most comprehensive utility software available for the Archimedes, a high quality, ergonomically designed to fit the shape of your hand, (see drawing above) scanner, which is fitted with a warning LED that will indicate if the scanner is being moved too quickly for accurate results. Additional twin guide rollers ensure precise tracking over the image, to make the best use of the high resolution available with this system. The yellow/amber illumination of our Mk II scanner, enables you to achieve optimum accuracy.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y directions separately.
Colour tinting.
X and Y flip.
Edge detection which turns solid objects into outlines.
Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

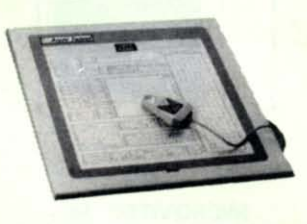
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

Launch offer £149
(P&P £4)

NEW

Archi Graphic Tablet



This package allows Archimedes users to take advantage of the low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this post itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics tablet as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tablet's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

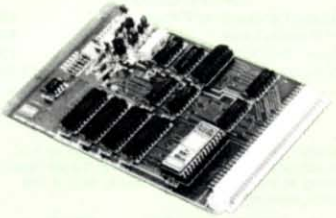
The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be re-mapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Launch Price £259

(Price includes Tablet, leads and software)
(P&P £4)

Archimedes Real-Time Digitiser



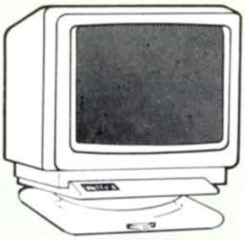
Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Please write in for further details.

Price £249

Continued

MONITORS



MICROVITEC 14"

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● **1451AP** RGB + PAL and AUDIO	£255
● **2030 CS** 20" Med Res	£399
● **2040 CS** 20" Hi Res	£675
● Dust Cover for Microvitecs	£5.50
● **Touchtec 501 Touch Screen**	£239

14" MULTISCAN COLOUR

● **TAXAN** Multisync 770 Plus	£425
● **TAXAN** Multiscan 870 16" Monitor	£575
● **TAXAN** Viking 19" Paper White, High Resolution (1152 x 896 with Archi 400 series)	£799
● **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89	£429
● **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch	£469

TAXAN 12"

● Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch	£269
● KX117 – Hi-Res Green Screen Monitor	£79

PHILIPS

● **BM7502** 12" Hi-res Green Monitor	£64
● **CM8833** 14" Med. Res Colour Monitor	£195

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £189

Dust Cover for Phillips Monitors £6

(Securicor carriage on Monitors £7)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

Price £12

PLOTTERS

● Plotmate A4S **£379** ● Plotmate A3M **£549**

Roland Plotters

(Official Roland Appointed Distributor)

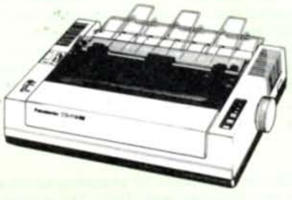
● **DXY 880A**	**£560**	● **DXY 1100**	**£630**
● **DXY 1200**	**£879**	● **DXY 1300**	**£1035**

TAXAN KP-815 PRINTER

Offer Price £149

Taxan KP915 132 Column	£275
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081



UK's most popular printer.

SALE OFFER only: **£135**

Optional RS232 Interface: £39

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

KX-P1180 Printer Offer

Panasonic KX-P1180 printer, Dump Out 3, Screen Dump ROM & a BBC printer Lead.

Offer Price £146

Panasonic Printers

● **KX-P1124** 24pin 80col. 192/63 CPS	£245
● **KX-P1180** 9pin 80col. 144/38 CPS	£146
● **KX-P1540** 24pin 136col. 240/80 CPS	£435
● **KX-P1592** 9pin 136col. 216/45 CPS	£275
● **KX-P1595** 9pin 136col. 288/61 CPS	£355

● **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price **£1,349**

● Spare Toner	£29	● A4 Feeder	£55
● Drum Unit	£149	● Developer	£115

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175;	KX-P1540 (P35)	£185
KX-P1124 (P36)	£88;	KX-P1180 (P37)	£79

BUFFERS

P12 4K Buffer Board for 1081	£55
P42 32K Buffer Chip for 1592/1595	£25
P43 32K Buffer Chip for 1540/1124	£25

Serial Interfaces

P17 P1081/1592	£32	P19 P1124/1180	£55

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081; 1592 & 1595 **£8**

P115 for KX-P1180 **£8** P145 for KX-P1124 **£8**

P140 for KX-P1540 **£10**

Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9.95 each**

INTEGREX COLOUR JET

● Colour Jet 132 Printer	£515
● Paper Roll	£6.50
● Screen Dump Software	£10
● Colour Cartridge	£16.50
● Black Cartridge	£10.35
● 100 A4 OHP transparencies	£55
● 8K Serial Interface Optional	£123

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer **£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£249

Pinwriter Serial Interface (optional)	£55
P2200 Cut Sheet Feeder	£59
Additional Font Cartridge	£25
P2200 P2200 Spare Ribbon	£6
P2200 Dust Cover	£5

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	**£439**	**NEC P7**+ 136 columns	**£575**
Colour Option	**£74**	Serial Interface	**£73**
Cut Sheet Feeder	**£125**		
NEC Ribbons for		P6 **£8**;	P7 **£9.50**

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

Star Printers

Star LC10	**£139**	LC10 Colour	**£185**
Star LC24-10	**£205**	XB24-10 Colour	**£425**
NB24-10	**£425**		
LC10 Colour Ribbon			**£6**
Cut Sheet Feeder			**£65**

EPSON PRINTERS

EX800	**£410**	LQ550	**£245**
EX1000	**£564**	LQ860 Colour	**£539**
FX850	**£279**	LQ1050	**£549**
FX1000	**£425**	LQ1060	**£679**
FX1050	**£395**	LQ2500+	**£839**
FX1060	**£679**	LQ2550+	**£895**
LQ500	**£239**	LX800	**£135**
LQ550	**£245**	LX400	**£139**
GQ3500 Laser	**£1150**	SQ2500	**£899**
LQ850	**£405**		

CUT SHEET FEEDERS for

EX800 **£149**; FX800/LQ800 **£149**; FX850/LQ850 **£149**; FX1000/LQ1000 **£179**; LQ500/LX800 **£79**; LQ1050 **£175**; LQ2550 **£390**.

TRACTOR FEED for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90**

ACCESSORIES

● EX800/1000 Colour Option	£55
● EX800/1000 Colour Ribbon	£18
● LQ2500 Colour Option	£65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 meter	£6
Nimbus Centronics Lead	£12
IBM Parallel Lead 1 meter	£6
Double Ended 36 way Centronic Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.

Listing Paper (Perforated)

● 1,000 Sheets 9½" × 11" Fanfold Paper	**£7**
● 2,000 Sheets 9½" × 11" Fanfold Paper	**£11**
● 1000 Sheets 9½" x 11" NCR 2 Part Fanfold	**£19**
● 1,000 Sheets 15" × 11" Fanfold Paper	**£9**
● 1000 Sheets true A4 Fanfold Paper 70gms	**£11**
● 2000 Sheets true A4 Fanfold Paper 70gms	**£19**
● Teleprinter Roll (Econo paper)	**£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

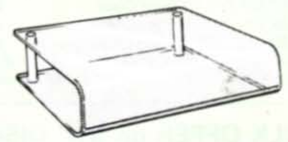
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000	90 × 36mm (Single Row)	**£5.00**
1,000	90 × 36mm (Twin Row)	**£4.90**
1,000	90 × 49mm (Twin Row)	**£7.50**
1,000	102 × 36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

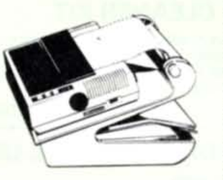
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £3)*

***132 Column version £26** (carr. £4)*

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
Brother HR15/20	**£3.00**	–
BBC Micro	–	**£3.50**
BBC Master	–	**£4.00**
Archimedes Micro pair	–	**£9.00**
Citizen 120D	**£3.95**	**£4.50**
RX/FX80/MX80	**£3.00**	
DMP2000	**£3.75**	**£4.75**
EX/LQ800	**£4.50**	**£4.50**
EX/LQ1000	**£7.50**	**£5.00**
RX/FX80/85/800/MX80	**£3.90**	–
RX/FX100/1000	**£5.75**	–
Kaga/Taxan KP810/815	**£4.90**	**£5.00**
LC10 (Black)	**£4.25**	**£5.00**
LQ500/800	**£3.75**	**£5.00**
LQ1050/LQ2500	**£8.50**	**£5.50**
LX80/86/800	**£3.80**	**£4.50**
M1009/GLP	**£3.80**	**£3.75**
Panasonic KX1080/81	**£4.00**	**£4.75**
SQ2500	**£23.00**	**£5.50**
Star NL10	**£3.75**	**£4.50**
Olivetti Ink Jet Cartridges (set of 4)	**£9**	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

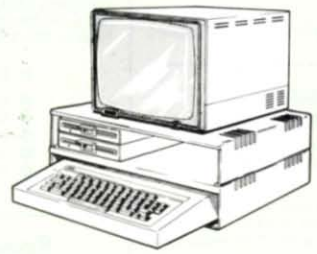
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics	P&P
2 to 1	£20	£22	£3
3 to 1	£27	£30	£3
5 to 1	£36	£39	£4

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



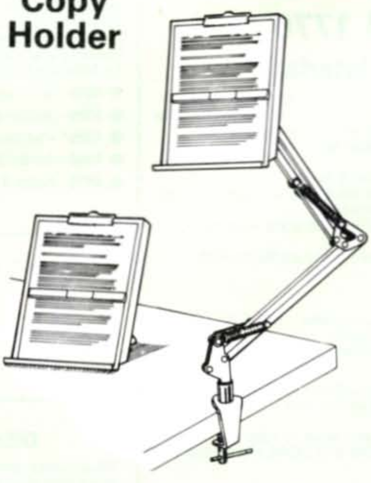
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm **£13**
Double BBC Plinth	420 x 310 x 210mm **£24**
Printer Plinth	420 x 310 x 105mm **£12**
Single Master Plinth	490 x 310 x 105mm **£14**
Double Master Plinth	490 x 310 x 210mm **£26**

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)

Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£20**
Compact AB Switch RS232	**£19**

(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm**.

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

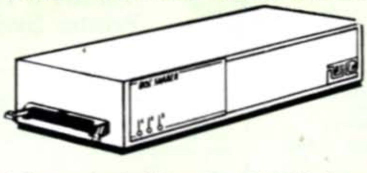
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

● *Watford's sophisticated DFS ROM only*	**£16**
● *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only*	**£12**
● *DFS Manual (Comprehensive)*	*(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

● SPECIAL PRICE	**£44.00**
● DDFS Manual	(No VAT) **£6.95**
● We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20**	Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.25**	Twin CD (with PSU) **£3.90**

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● *10 × 5.25" S/S D/D 40 Track Diskettes (744)*	***£6.00***
● *10 × 5.25" D/S D/D 40 Track Diskettes (745)*	***£7.00***
● *10 × 5.25" S/S D/D 80 Track Diskettes (746)*	***£11.50***
● *10 × 5.25" D/S D/D 80 Track Diskettes (747)*	***£11.00***
● *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£16***
● *10 × 3.5" S/S D/D 40/80 track Discs*	***£10.00***
● *10 × 3.5" D/S D/D 40/80 track Discs*	***£11.75***
● *10 × 3.5" High Density Diskettes*	***£25***

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 ×* ***M3*** *3.5" D/S D/D 80 Track Discs*	***£10***
● *10 ×* ***M9*** *3.5" Double Side High Density*	***£25***
● *10 ×* ***M4*** *5.25" S/S D/D 40 Track Discs*	***£5***
● *10 ×* ***M5*** *5.25" D/S D/D 40 Track Discs*	***£7***
● *10 ×* ***M7*** *5.25" D/S D/D 80 Track Discs*	***£9***
● *10 ×* ***M8*** *5.25" D/S H/D Hi-Density Discs*	***£14***
● *3" Double Sided Discs*	***£2.50*** *each*

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

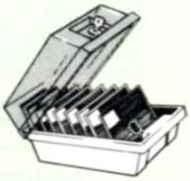
Price £4

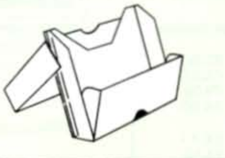
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case* that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

● **M35** - holds upto 50 5¼" discs	£4.95
● **M85** – holds upto 95 5¼" discs	£6.95
● **M25*** – holds upto 25 3 ½" Discs	£4.95
● **M50** – holds 50 3½" Discs	£6.50
● **M10** – holds 8 of No. 10 Data Cartridges	£15

* Not lockable

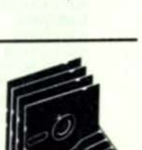




PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK



When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket. **£4**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with an Utilities Disc.

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

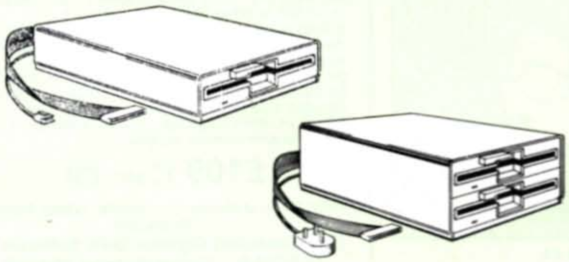
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges**. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today)!*

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD 400 £168	CS 400S £85	CD400 £188
800K (1.44M)		CLD 800S £153		CD 800S £163

- TWIN Disc Drive Case, complete with Power Supply & Cables **£43**

Securicor carriage on Disc Drives £6 to £7

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer

- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

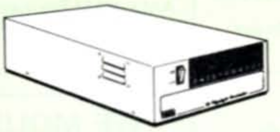
Drives to connect to BBC Micros own PSU

- **CLS35 400K Unit £69**
- **CLD35 Twin 800K £125**

Drives with built-in Power Supply Unit

- **CS35 Single 400K £85**
- **CD35 Twin 800K £135**

(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

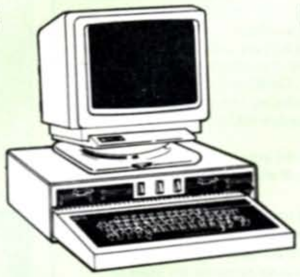
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

- 30 Megabyte BBC Hard Disc **£369** (carr £9)

DP35-800S



DP35-800S

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £179

A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

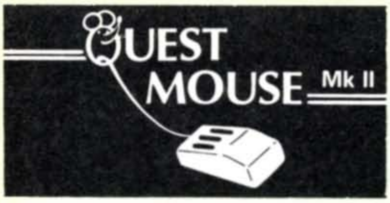
The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £165

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued →



● Quest Mouse II & Quest Paint	£58
● Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
● Quest Mouse II only	£29
● Quest Paint Software only	£34
● Quest Font Disc	£15
● Quest Mouse Mat (Red or Blue or Green please specify)	£3
● Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
● GXR ROM for the BBC Micro	£22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30

(Price includes software in ROM and a comprehensive Manual).

(Not Compatible with BBC Compact)

NEW

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£52

THE NEW Mk III AMX MOUSE

Inc. Super Art package

ONLY: £59 (carr £3)

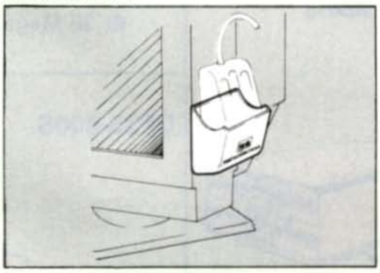
(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£13
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.



Price £4

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image. Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Magazine Maker

(As seen on TV)

A combination of Stop Press and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

WAPPING
EDITOR
"MIGHTIER THAN THE QUILL"

The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantge of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, detailed elsewhere in our advert, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-past, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designedto take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

For convenience all types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, despensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistication with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

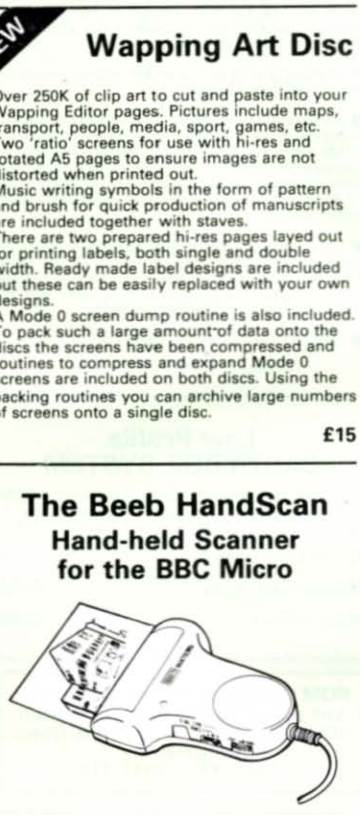
NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games, etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.
A Mode 0 screen dump routine is also included.
To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routines you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan
Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer for the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilitiesis provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various type of dithering may be selected to simulate the grey levels of a scanned picture. All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

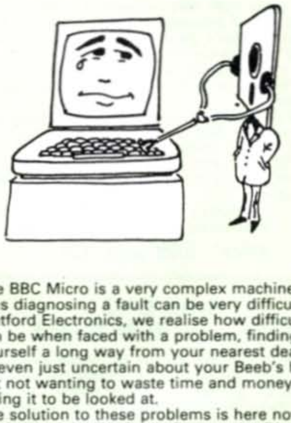
NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS432, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

NEW

Beeb DOS 2.2

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.
Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive. Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive manual.

Price: £39

(Please write in for technical literature)

Continued →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
	Aries B-12	£36
	Aries B-12C	£5

ARIES B-488 IEEE-488 INTERFACE UNIT

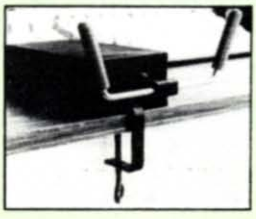
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

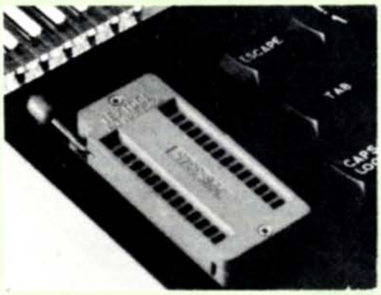
Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£26**

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the Keyboard.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc.
Twin **£8**; Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

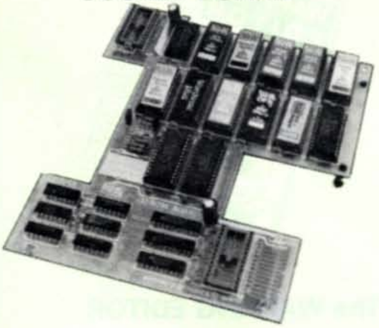
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£32** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

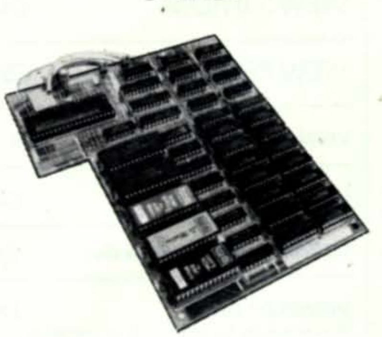
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

● ROM/RAM card with 32k dynamic RAM	***£48***
● ROM/RAM card with 64k dynamic RAM	***£65***
● ROM/RAM card with a massive 128k dynamic RAM	**£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

● 16k plug-in Static RAM kit	**£10**
● 16k Dynamic RAM for Upgrade	**£17.50**
● Battery backup	**£3**
● Read and Write protect switches	**£2** each
Complete ROM-RAM board All options installed	**£115**

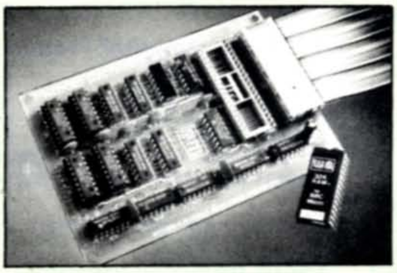
P.S.

Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

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● Maths with a Story 1 (Disc). 4 primary level maths programs	**£11.25**
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Educational Software

FUN SCHOOL 2 – Red:

Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic.

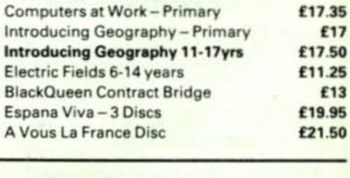
FUN SCHOOL 2 – Green:

6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump. **£11**

FUN SCHOOL 2 – Blue:

Over 8 yrs – Eight programs on Disc. Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. **£11.25**

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued

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ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
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Wordwise	£26

Wordwise plus	**£40**

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC:	**£5**
SPELL MASTER	**£42**
Inter SHEET	**ONLY £37**
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MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM	**£76**

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All Prices Exclusive of VAT

MINI OFFICE II

DISC Version for BBC B & B+	**£14.00**
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Disc Version for the Compact	**£18.00**

(When ordering please specify for which Micro & 40 or 80 track Disc).

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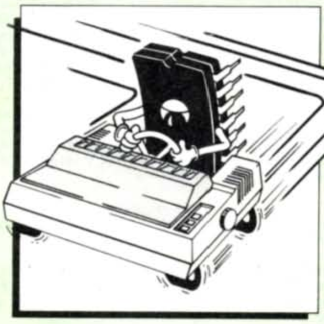
Advanced File Manager	**£25.00**
Advanced Control Panel	**£30.00**

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW WORDPROCESSOR 2.1	**£35**
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
VIEWSHEET (Acornsoft)	**£36**
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OVERVIEW Packs 1 & 2	**£69**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	**£8**
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OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

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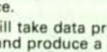
STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
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DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

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The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worth-while addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

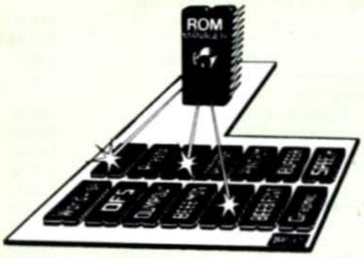
The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)
Example programs on Disc £4.95

Continued →

ROM MANAGER

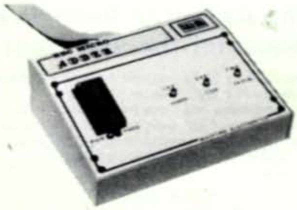


Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.

"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.

Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.

The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
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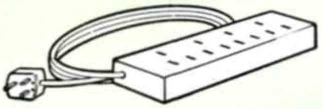

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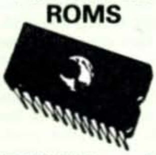

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THE only difficulty I had in reviewing Pineapple's Advanced Disc Utilities rom – ADU – was in deciding the gold standard I should use for comparison. My BBC Master with second processor is served by a Viglen hard disc which comes with an ADFS utilities package. Many of these are duplicated by ADU, which does however have several useful additions and refinements.

Ever since I got my Master, Advanced Computer Product's Advanced Disc Toolkit – ADT – has been permanently resident in socket eight. Would ADU replace either the Viglen utilities, ADT or both?

Installation was simple, positioning the 16k rom in socket seven in the first instance. In my set-up this is below ADT, which I discovered had to be unplugged before ADU worked satisfactorily. Other roms are housed in cartridges, and there was no apparent interference. Some zero page locations allocated to Econet are used, and major routines also use parts of pages B and C. On a Master these have been reallocated for the Econet, but on models B/B+ there will be a loss of function key definitions and defined characters 128 to 159.

In fact using ADU on my Master I found that although function key definitions were retained, there were clashes with a machine code program I use to put a ruler cursor into View. There is an option to define foreground and background colour of the ADU menu but there is not much point in it since your chosen colour is lost as soon as an application is selected.

Essentially, ADU works as the manual says it does. I altered my hard disc !boot program to read simply *ADU, which puts you straight into menu mode after language selection. The menu is the key to working with ADU, although many of the routines are individually selectable by the appropriate star command. The first time I entered *MENU I expected a list of options, not having read the manual fully.

In fact *ADU on start up, or *MENU at any stage, reads in the root, current or specified directory. Headed by the drive number, directory name and title, the contents of the directory are tabulated. Each object is accompanied by a letter denoting the type of file – inverse D for directory, normal D for data, V for a View file and so on. The lowest part of the screen details the roms in the system, very similar to the Viglen utilities package.

A highlighted cursor, movable around the screen using the arrow keys or the usual game keys – Z X : / – is used to select the object within the directory that you want to enter. ADU then processes the selected object appropriately: Thus Basic programs are CHAINed, View files initialise View and are then automatically loaded, and machine programs are *RUNned.

If the selected object is a sub directory you move around the directory tree accordingly, ending with the menu display for the selected directory. ↑ moves up a directory, $ returns you to the root directory, @ displays information about the current directory and ? displays the address and attributes of the object under the cursor. This is a very flexible and easy method of browsing through the directory structure of an ADFS disc, and can be entered at any defined point in the structure.

The command *MENU can be caught out however, and on first using ADU some of my files were incorrectly identified. Some View files were labelled as ViewSheet or data files. The manual states that if a Basic program is saved by the Basic Editor it will be recognised as machine code, and that View files copied from DFS to ADFS are mistaken for ViewSheet spreadsheets.

It didn't explain how mine came to be mistaken for data files, particularly as they had been written in View on ADFS. However this was more irritating than serious, as ADU simply entered View and READ the data files. It couldn't cope and found no file for those identified as spreadsheets. If you can correctly identify your files it is a simple matter to recategorise them from the menu using Shift+Copy and pressing the appropriate option key listed in the manual and provided as a continuous sequence at the foot of the screen.

The beauty of ADU lies in the other applications that can be entered directly from it without the need to load files or define addresses as is necessary with ADT. Disc editing becomes simplicity itself. Pressing K while in Menu – or *DISCEDIT <filesp> if not – takes you straight to the first sector of the file under the cursor, after reading the address from the free space map. Simple prompts tell you how to edit in hex or

Ascii, very similar to *DEX of ADT.

Other options from the menu include drive selection, file deletion, wipe paged ram bank, and disc dismount which has the effect of *BYE. Roms can be inserted, saved to disc or unplugged.

Initially I was terrified of compacting my hard disc and now am just uneasy. It's the way the screen becomes littered with the contents of my thesis, papers, letters, data files and programs in a whole rainbow of colours.

The ADU compaction, initiated by pressing C, made the process less nerve wracking. A list of sectors appears on the screen with bytes used, bytes free and the addresses of all free space. The routine keeps on repeating until all free space is contiguous rather than scattered around the disc. You can stop at the end of the current compaction run by pressing Escape.

The other utilities on ADU are concerned with disc manipulation. I didn't test all the features of *BACKUP, but the manual says that backup to and from discs of different size is possible, including between floppies and a Winchester, as the routine will not copy beyond the highest used sector of the source disc.

Copying files from DFS to ADFS has so far been a fairly tiresome task. *DFSADFS copies the whole of the DFS disc to any specified ADFS directory, with the option at the start to wait for a Yes prompt before copying each file. Don't be caught out by the simple error of identifying both drives in ADFS. To copy DFS from drive 0 to a Winchester directory RCP for example, use *DFSADFS 0 :0.$.RCP.

I found the *DIRDESTROY particularly useful, avoiding having to clear directories before they can be deleted. Again there is the option to await a prompt before each object is lost for ever. *PURGE <drive-number> does exactly what it sounds it should do, wiping the whole disc of everything except a clear free space map and an empty root directory very quickly. In the wrong hands this command could be dangerous, but it is quicker than having to reformat.

Overall I thought that ADU was easy to use, though some of the procedures may take some time to become accustomed to. I liked being able to enter *MENU from an application which has the facility for *commands, such as View, without having to keep backtracking and reloading, and being able to enter applications directly from it.

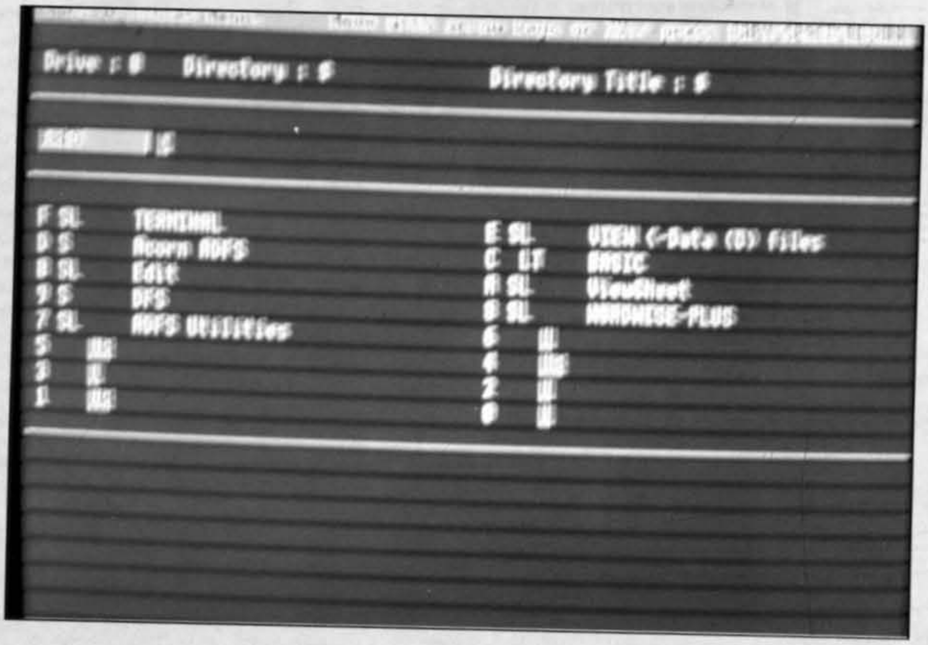
Commands like DISCEDIT, DIRDESTROY, PURGE and a few others are useful additions or refinements and make disc manipulation slightly easier. ADU doesn't offer much over what is already available on the Viglen utilities, but anyone using ADFS without this facility will find it a very useful addition to their system.

A few minor adjustments such as listing subdirectories and files separately on the screen menu would encourage me to use this rom instead of the Viglen utilities. Unless you're into serious disc editing, manipulation or crashing you probably won't need ADT as well.

If, like me, you always want to check if the rom you've just unplugged really has been disabled, you'll appreciate *KILLADU which produces *Aaarrrggghhh!* on the screen.

Summing up

This rom is particularly easy to use and streamlines many ADFS operations when in the menu. The major commands are also available as star commands which can be accessed from applications. The only point of confusion is the fact that directories are not separated from files in the menu.



```
Drive : 0   Directory : $          Directory Title : $

F SL   TERMINAL
D S    Acorn ADFS                  E SL   VIEW (<Data (D) files
B SL   Edit                        C  LT  BASIC
9 S    DFS                         A SL   ViewSheet
7 SL   ADFS Utilities              8 SL   WORDWISE-PLUS
5                                  6
3                                  4
1                                  2
                                   0
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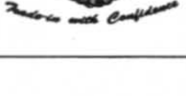

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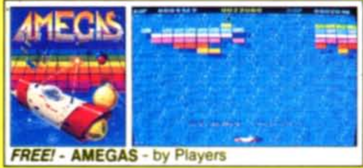

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FREDDY'S FOLLY

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ORION

Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants –otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

MISSILE CONTROL

Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.

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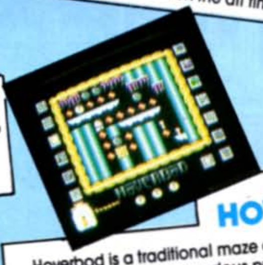

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Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware . . . the Ibbles and Squibbles start to materialise!!!!

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Shout your wares with style

George Speller shows how products can be labelled in a cheap, easy way

LOTS of items need labels – discs and health foods to name just a few. I sell the latter and the more exotic a muesli the more labelling it needs – and it hurts the pocket to buy 1,000 stickers from a printing firm when we only need 200 before the recipe changes. So here's a routine to produce as many or as few professional-looking labels as you want.

LaBelle can be used to produce a great variety of label sizes and print styles. Four sizes of printed type are available from superscript – tiny and neat – to a bold double width for headings and all type can be plain or italic.

The program is very flexible, makes full use of the potential of Epson-compatible printers, and is easy to operate. The simple editing system could be classified as wysinwyg – what you see is *nearly* what you get. In the editing screen Mode 3 characters are used throughout, although adequate indications are given as to the final effect.

Unlike a word processor, each line is treated as a separate entity, and no wrapround is provided. We are not, after all, dealing with huge blocks of text.

The type styles and sizes are selected during editing and are indicated on the screen. The practical upper limit of label width is 4in, about 40 standard characters. The maximum height of the label depends on the size of type used, but decent effects can be created up to a size of 1.5in. Label size is normally set before editing, but may be changed at any time. Facilities are provided to load and save label designs to disc, and all details of size and typeface are included in the file.

The program was designed to use shadow ram for the Mode 3 editing screen, but on most disc filing systems works if PAGE is set to &1300 before CHAINing the program. If this causes problems with your DFS the utility can be shortened by dispensing with the items that are there just to make the program easy to read – REM statements, spaces and long variable names.

Limitations of memory and speed have forced a few minor compromises. Firstly, it is not practicable to display scale characters on the screen during editing. But to give a good idea what the output will look like left and right margins for the various field sizes of each line are centred on the screen. A column of pairs of numbers on the left of the display indicate the chosen style for that line – and this choice is reflected in the size of the cursor.

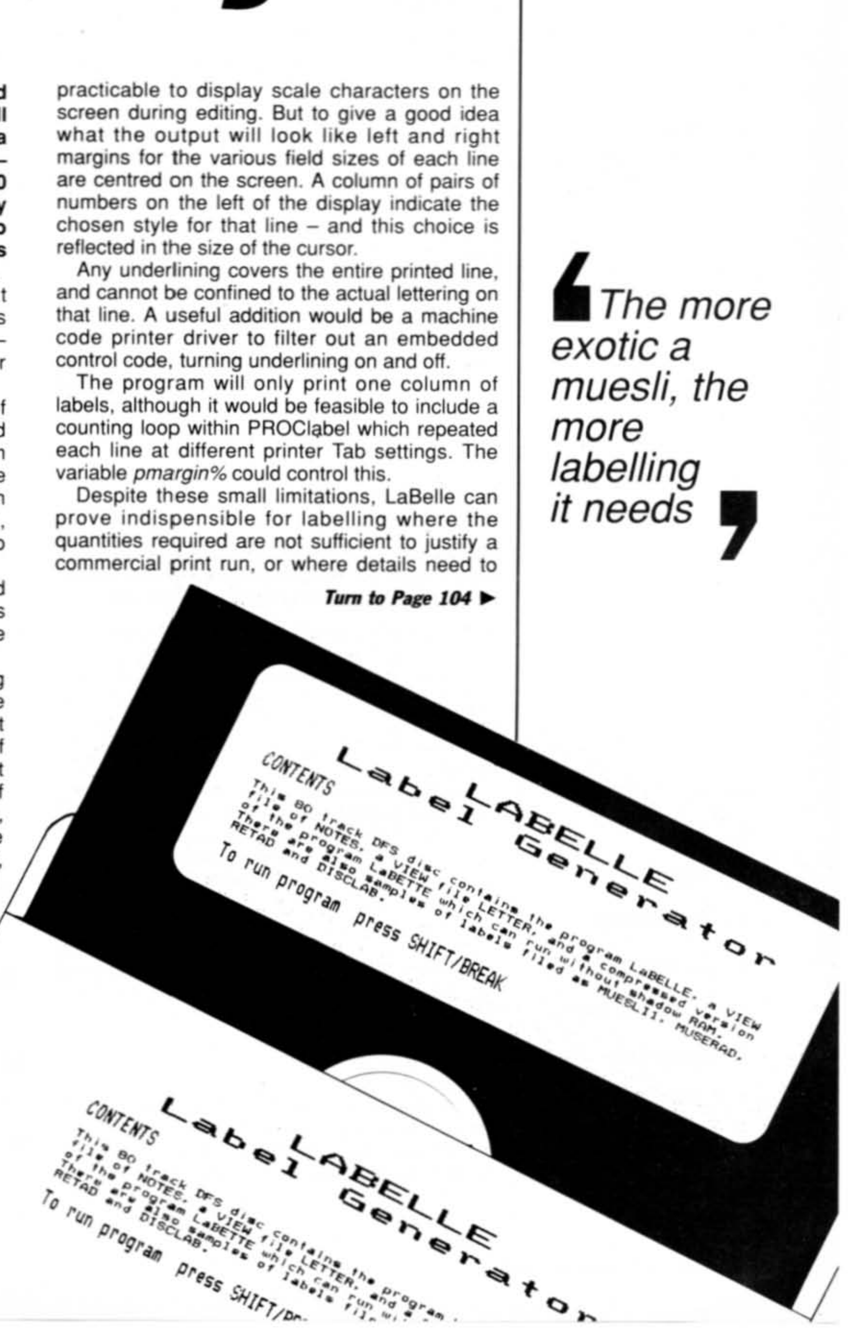
Any underlining covers the entire printed line, and cannot be confined to the actual lettering on that line. A useful addition would be a machine code printer driver to filter out an embedded control code, turning underlining on and off.

The program will only print one column of labels, although it would be feasible to include a counting loop within PROClabel which repeated each line at different printer Tab settings. The variable *pmargin%* could control this.

Despite these small limitations, LaBelle can prove indispensible for labelling where the quantities required are not sufficient to justify a commercial print run, or where details need to

Turn to Page 104 ►

> *The more exotic a muesli, the more labelling it needs*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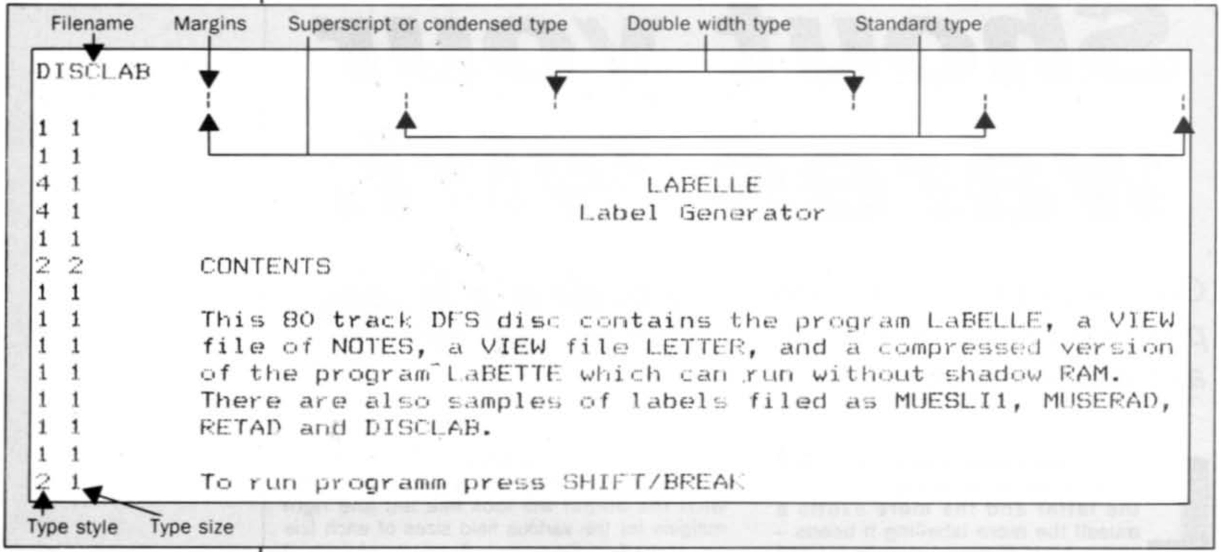

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1 1
4 1                              LABELLE
4 1                          Label Generator
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1 1
1 1       This 80 track DFS disc contains the program LaBELLE, a VIEW
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1 1       There are also samples of labels filed as MUESLI1, MUSERAD,
1 1       RETAD and DISCLAB.
1 1
2 1       To run programm press SHIFT/BREAK
```

The editing screen of LaBelle

◀ *From Page 103*

be revised from time to time. Also the labels look pretty good.

The options on the main menu work like this:

SET UP is used when creating a new label or amending an old one. It governs vertical pitch, height of printed area within the label, printer margin and width of printed area. Horizontal measurements are in compressed or superscript characters, and verticals are in 1/216in. The default settings are for a 4in by 1.5in label. If an existing label is amended using set up, you should enter the edit system to check the effects of any changes.

FILING saves and loads all the text – up to 25 lines – plus all the parameters of size, width, typeface as selected during set up and edit.

EDIT presents a Mode 3 screen with markers at the top showing the extent of the field sizes available. Typeface indicators at the left show two digits per line. The first is the type size and the second the style. Both are selected for individual lines using the function keys shown on the left.

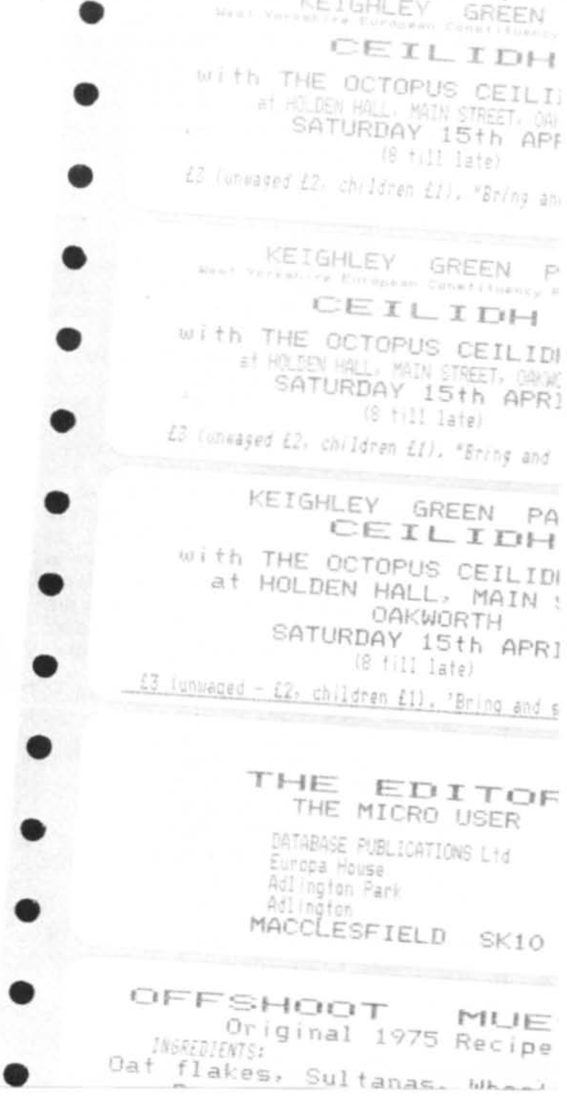
Any type selection may be used with any style selection except superscript with underlined. The line feed after a superscript line is very small and some letters may clash with larger type on the next line. If in doubt, you should leave a superscript line blank before lines of larger text.

The arrow keys control movement of the cursor in the fields which are centred and sized according to type width to help setting out. Each field will occupy a full line on the label when printed out. Shifted arrow keys are used in a logical way to insert and delete lines and characters.

The displayed area will change according to the sum total of the sizes of characters selected in each line. For example, if some lines are in a large typeface fewer lines are available for

Key	Use
0	Exit from Edit mode
1	Superscript type
2	Condensed type
3	Standard type
4	Double width type
5	Standard style
6	Italic style
7	Underlined

The use of the function keys in Edit mode



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◄ *From Page 104*

printing so fewer are displayed. All text – up to 25 lines – is preserved in memory even if it's not displayed and it will return if visible lines are deleted or made smaller in height.

PRINT requests the number of labels needed and then outputs the labels. To abort or pause just hold the spacebar – remember that the printer buffer will have to empty before printing stops. An option is then given to continue or abort, and if the former is selected a prompt is given to let you adjust the margin in order to line up with the edges of the labels. Pressing Return causes printing to continue as previously. The vertical position of the label relative to the print head may also be tweaked during a spacebar pause.

QUIT returns you to Basic. Note that if Escape is used at any time you are prompted to save your work.

```
   10 REM LABELLE
   20 REM By George Speller
   30 REM (c) The Micro User
   40 :
   50 MODE7
   60 ON ERROR GOTO 4030
   70 PROCinit
   80 REPEAT
   90 MODE7
  100 PROCmainmenu
  110 IF M%=1 MODE7:PROCsetup:PROCparams
  120 IF M%=2 MODE7:PROCfile
  130 IF M%=3 MODE3:PROCedit
  140 IF M%=4 MODE7:PROCprint
  150 UNTIL M%=5
  160 END
  170 :
  180 DEFPROCparams
  190 max%=height%/13
  200 maxlines%=height%/15
  210 lf%(1)=15:lf%(2)=28:lf%(3)=32
  220 lf%(4)=32
  230 len%(1)=maxlen%:len%(2)=maxlen%:le
n%(3)=(maxlen%*3/5)
  240 len%(4)=(maxlen%*3/10)
  250 inset%(0)=0:inset%(2)=0:inset%(3)=
(maxlen%-len%(3))/2
  260 inset%(4)=(maxlen%-len%(4))/2
  270 IF flag1% PROCtotlf
  280 flag1%=TRUE
  290 ENDPROC
  300 :
  310 DEFPROCinit
  320 *KEY0 "|!|A"
  330 *KEY1 "|!|B"
  340 *KEY2 "|!|C"
  350 *KEY3 "|!|D"
  360 *KEY4 "|!|E"
  370 *KEY5 "|!|F"
  380 *KEY6 "|!|G"
  390 *KEY7 "|!|L"
  400 *FX4,1
  410 F$="No file"
  420 abort%=FALSE
  430 exit%=FALSE
  440 flag1%=FALSE
  450 tit$=CHR$129+CHR$157+CHR$131+CHR$1
41+"LABELLE   "+CHR$156
  460 DIM data$(25),type%(25),style%(25)
,len%(4),inset%(4),lf%(4)
  470 height%=270
  480 maxlen%=60
  490 totlf%=0
  500 pmargin%=0
  510 pitch%=324
  520 clear$=STRING$(maxlen%," ")
  530 PROCparams
  540 FOR B%=0 TO max%
  550 type%(B%)=1:style%(B%)=1
  560 data$(B%)=clear$
  570 NEXT B%
  580 DIM option$(8)
  590 DATA Set up,Filing,Edit label,Prin
t Label,Quit
  600 FOR N%=1TO5
  610 READ option$(N%)
  620 NEXT N%
  630 VDU 23;11,0;0;0;0
  640 ENDPROC
  650 :
  660 DEFPROCtitle
  670 PRINTTAB(12,1)tit$'TAB(12,2)tit$
  680 ENDPROC
  690 :
  700 DEFPROCmainmenu
  710 *FX21,0
  720 PROCtitle
  730 VDU 28,0,24,39,6
  740 FOR N%=1TO5
  750 PROCline(N%,32,156,135)
  760 NEXT N%
  770 line%=1:select%=FALSE
  780 PROCline(line%,132,157,135)
  790 REPEAT
  800 oldline%=line%
  810 G%=GET
  820 IF G%=138 line%=line%-(line%<5)
  830 IF G%=139 line%=line%+(line%>1)
  840 M%=G%-48
  850 IF M%<6 AND M%>0 line%=M%:select%=
TRUE
  860 IF G%=13 M%=line%:select%=TRUE
  870 PROCline(oldline%,32,156,135)
  880 PROCline(line%,132,157,135)
  890 UNTIL select%=TRUE
  900 G%=INKEY(50)
  910 ENDPROC
  920 :
  930 DEFPROCline(N%,newcol%,back%,col%)
  940 PRINT TAB(10,N%)CHR$newcol%;CHR$ba
ck%;CHR$col%;N%;" ";option$(N%);TAB(27,N
%);CHR$156;
  950 ENDPROC
  960 :
  970 DEFPROCdisplay
  980 VDU 28,0,1,79,0
  990 PRINT F$;
 1000 PRINT TAB(10,1)"|";TAB(10+inset%(3
),1)"|";TAB(10+inset%(4),1)"|";
 1010 PRINTTAB(10+len%(4)+inset%(4),1)"|
";TAB(10+len%(3)+inset%(3)-1,1)"|";TAB(1
0+maxlen%-1,1)"|";
 1020
 1030 PROCmark
 1040 VDU28,10,24,79,2
 1050 CLS
 1060 FOR N%=0 TO maxlines%
 1070 PRINT TAB(inset%(type%(N%)),N%)dat
a$(N%);
 1080 NEXT N%
 1090 ENDPROC
 1100 :
 1110 DEFPROCsetup
 1120 PROCtitle
 1130 cvpitch%=pitch%:cvheight%=height%:
cvpmargin%=pmargin%:cvmaxlen%=maxlen%
 1140 VDU 28,0,24,39,6
 1150 PRINT TAB(3)"Label pitch 1/216 in.
";cvpitch%
 1160 PRINT TAB(3)"Height in 1/216 in...
";cvheight%
 1170 PRINT TAB(3)"Margin in characters.
.";cvpmargin%
 1180 PRINTTAB(3)"Width in characters...
";cvmaxlen%
 1190 REPEAT
 1200 REPEAT
 1210 INPUT TAB(31,0)pitch%
 1220 UNTIL pitch% >=0 AND pitch%<=324
 1230 IF pitch%=0 pitch%=cvpitch%
 1240 PRINT TAB(31,0);pitch%;SPC(3);
 1250 REPEAT
 1260 INPUT TAB(31,1)height%
 1270 UNTIL height%>=0 AND height%<=300
 1280 IF height%=0 height%=cvheight%
 1290 PRINT TAB(31,1);height%;SPC(3)
 1300 UNTIL height%<pitch%
 1310 REPEAT
 1320 PRINT TAB(31,1);height%;SPC(3)
 1330 INPUT TAB(31,2)pmargin$
 1340 IF pmargin$="" pmargin%=cvpmargin%
 ELSE pmargin%=VAL(pmargin$)
 1350 UNTIL pmargin%>=0 AND pmargin%<100
 1360 PRINT TAB(31,2);pmargin%;SPC(3);
 1370 REPEAT
 1380 INPUT TAB(31,3)maxlen%
 1390 UNTIL maxlen% >=0 AND maxlen%<=60
 1400 IF maxlen%=0 maxlen%=cvmaxlen%
 1410 PRINT TAB(31,3);maxlen%;SPC(3)
 1420 ENDPROC
 1430 :
 1440 DEFPROCfile
 1450 PROCtitle
 1460 *.
 1470 PRINT"Load or Save  L/S"
 1480 PRINT"Any other key:Abort"
 1490 X=GET OR 32
 1500 IF X=108 PROCload
 1510 IF X=115 PROCsave
 1520 ENDPROC
 1530 :
 1540 DEFPROCload
 1550 VDU 28,0,24,39,23
 1560 CLS
 1570 REPEAT
 1580 INPUT"File name to load ";F$
 1590 UNTIL LENF$<8
 1600 IF F$="" ENDPROC
 1610 F=OPENIN(F$)
 1620 INPUT#F,max%,pitch%,height%,pmargi
n%,maxlen%
```

FORE!!!

Steve Botterill presents the first in a two part series to help you better your score in Holed Out!!

IN the eyes of many people, golf is a simple, silly game where you hit a small ball as far as you can with a big stick and then walk miles to find it. But nothing could be further from the truth. It is in fact almost a science – all about using specially designed and crafted tools to propel a projectile at a precise speed and trajectory in order to achieve incredibly controlled accuracy within a deliberately hazardous environment. Let's take a look at how it's done.

Much of the skill of golf is knowing and understanding the effects of the different clubs on the ball. There are woods, irons and a putter and each have their own characteristics, as you can see from the panels. So you need all these different clubs both to impress your opponent and to deal with hazards – bunkers, water, trees and rough.

You have to be able to hit the ball over many of them and yet have the right amount of run-on to stop it going too far and ending past the hole or going into the next hazard. If you hit the ball at full power with a 1 wood it can roll for up to 90 yards or more after striking the ground. There is obviously a good chance that it may meet a course hazard. A ball hit with a wedge will stop only a couple of yards after landing, as its trajectory is totally different.

Trees are a big factor when choosing a club. If you need to go over you must select a club that will achieve maximum ball height at the time it is passing over the trees. As this occurs about halfway through its flight you only need to check the maps in the Holed Out!! manual to find out how far away the trees are. The reference card can then be used to work out which club you need.

If you get into a bunker or rough in the game it is a real nuisance unless you can reach the green, as it generally means a wasted shot. Additionally you can get a good lie or bad lie in Holed Out!!, and this significantly affects the club you should use.

The lie is a description of how easy or difficult it is to hit the ball. If you are in rough it describes whether the grass is long or short and if you are in a bunker it lets you know if the ball is stuck in the sand or sitting on the surface. In either case a bad lie means that only very high irons will be effective as the other clubs will not give the ball enough rise to clear the hazard.

A good lie means the ball is easier to hit and

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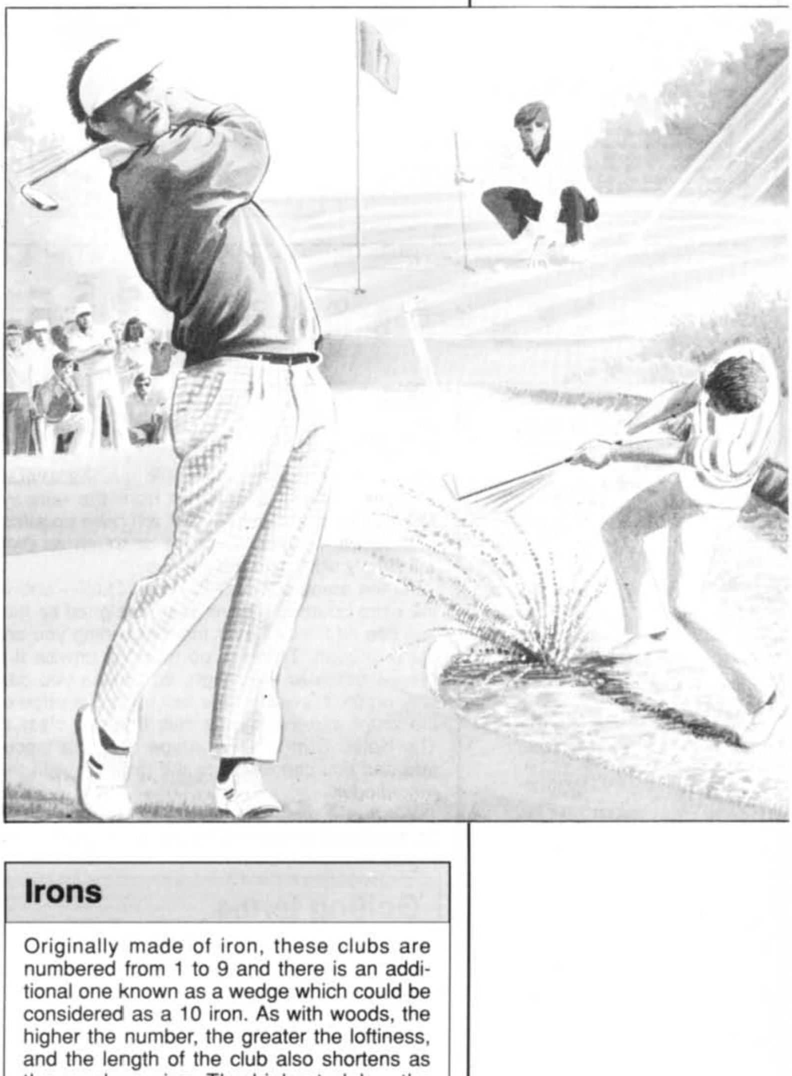
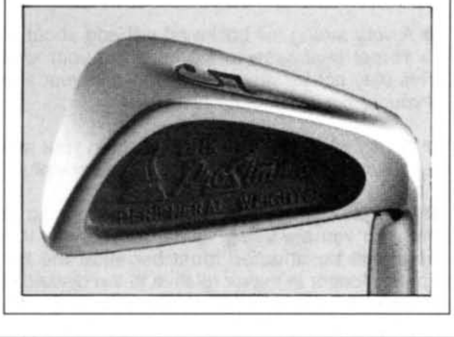
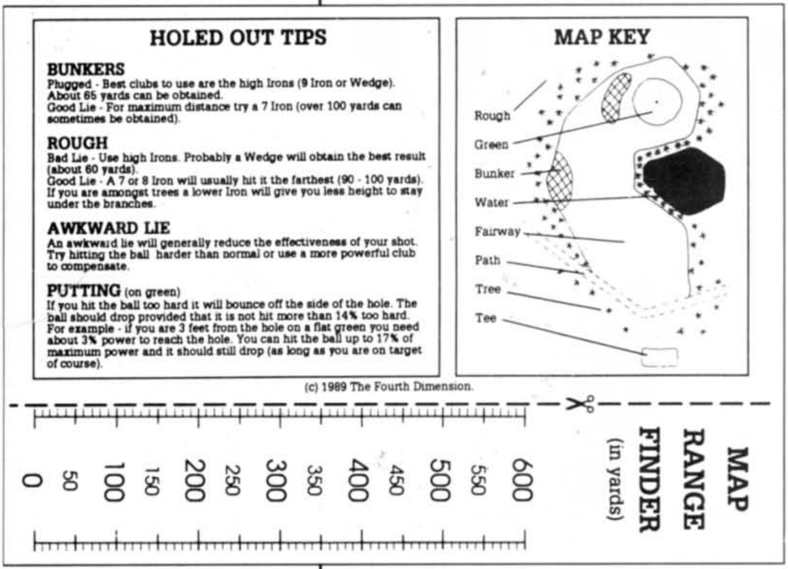


Irons

Originally made of iron, these clubs are numbered from 1 to 9 and there is an additional one known as a wedge which could be considered as a 10 iron. As with woods, the higher the number, the greater the loftiness, and the length of the club also shortens as the numbers rise. The highest club – the wedge – is extremely lofty and hits the ball almost straight up but hardly any distance.



Steve Botterill is the co-designer of Holed Out!! – the 3D golf game from The 4th Dimension. Here he gives some general tips for new golfers wanting a round. Next month Steve will be playing the first nine holes at the Pine Isles course and the following month he'll complete it. You'll be able to follow him round to help improve your handicap.


MAP KEY
Rough
Green
Bunker
Water
Fairway
Path
Tree
Tee
MAP RANGE FINDER
(in yards)
0
50
100
150
200
250
300
350
400
450
500
550
600

HOLED OUT TIPS

BUNKERS
Plugged - Best clubs to use are the high Irons (9 Iron or Wedge). About 65 yards can be obtained.
Good Lie - For maximum distance try a 7 Iron (over 100 yards can sometimes be obtained).

ROUGH
Bad Lie - Use high Irons. Probably a Wedge will obtain the best result (about 60 yards).
Good Lie - A 7 or 8 Iron will usually hit it the farthest (90 - 100 yards). If you are amongst trees a lower Iron will give you less height to stay under the branches.

AWKWARD LIE
An awkward lie will generally reduce the effectiveness of your shot. Try hitting the ball harder than normal or use a more powerful club to compensate.

PUTTING (on green)
If you hit the ball too hard it will bounce off the side of the hole. The ball should drop provided that it is not hit more than 14% too hard. For example - if you are 3 feet from the hole on a flat green you need about 3% power to reach the hole. You can hit the ball up to 17% of maximum power and it should still drop (as long as you are on target of course).

(c) 1989 The Fourth Dimension.

Part of the quick reference guide supplied with Holed Out!!

Woods

You can have up to three woods numbered 1, 2 or 5, with the 1 wood – otherwise known as a driver – being the most powerful. They are called woods because the part of the club which hits the ball was traditionally made of wood, but is now often made of other materials.

Woods are the longest clubs, so the head travels very fast when you take a swing at the ball giving extra impact on contact and therefore power. The face of the club – the side that hits the ball – is quite flat so it tends to apply the power in a largely forward rather than upward direction.

A driver is the most flat-faced and a 5 wood is more lofted. This means that the ball will rise more steeply with a 5 wood, but as more of the power has been used to generate height the ball will not travel as far.

Woods are usually used from the tee except on very short holes, but can be used on the fairway to good effect.

◀ ***From Page 107***

most Irons can be used, although the overall shot will not be as good as from the fairway. Many clubs particuarly woods will have no effect whatsoever in either bunkers or rough as they will simply skim over the surface.

All the areas of water in Holed Out!! – and in the extra courses – have been designed so that you can hit the ball over them providing you are close enough. Trying to go round is unwise if it means going in the rough, so unless you can stay on the fairway hit the ball up to the edge of the water and then use a club that can clear it. The Holed Out!! manual maps are quite accurate and you can measure the distance with the rangefinder.

Wind is a major problem and can only really be mastered by experience because wind direction and speed are so variable. As a general guide consider these criteria:

Golfing terms

Par	The expected score
Bogie	One over par
Birdie	One under par
Eagle	Two under par
Albatross	Three under par

- A very strong full backwind will add about 10 to 15 per cent extra to the length of your shot. This may not be wanted and can ruin your shot if you do not allow for it.

- A very strong headwind will shorten your shot by 10 to 15 per cent and is generally unhelpful.

- The effect of sidewinds varies depending on the club you are using. Shots played with lofty ones will be affected most because the ball spends longer in the air relative to the distance it travels. A very strong crosswind will greatly affect a wedge shot and a lot of compensation is required – it is useful to know that it can be better to offset the effects of the wind using hook or slice although this does take a little practice.

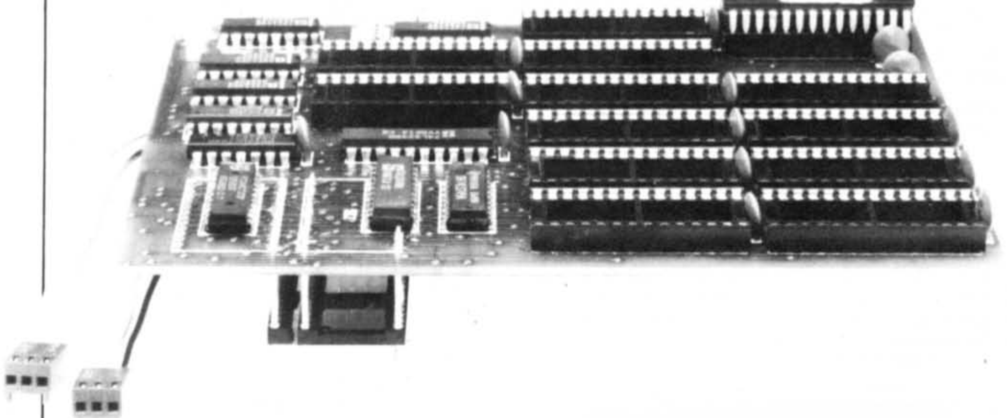
- If the wind is blowing from an angle your adjustment calculations are a little tricky. If the wind is not too strong it shouldn't affect the ball too badly in either direction, but stay well away from hazards.

Well I'm off for a few rounds at the 19th hole. Next month I'll start a shot by shot account of a round at Pine Isles – the harder course from the original Holed Out!!. I'll be including all the mistakes I make, so if you play at the same time as you read it you may well be able to give me a thrashing.

Putter

The putter is quite different to any other club and is only intended for use on the green. It is flat faced and usually shorter than any other. If you try to use a putter on the fairway in Holed Out!! some very strange things can happen as the ball will bounce all over the place due to bumps on the grass.

All aboard!



Squeezing more into your Master? Robert Pearson checks out an option

Product: Morley Master AA board
Price: £46
Supplier: Morley Electronics, Maurice Road Industrial Estate, Wallsend, Tyne and Wear NE28 6BY.
Tel: 091-257 6355

THE facility to add four extra roms using the cartridge slots of the BBC Master is very useful. However, with the ever-increasing amount of rom-based software available, even this space is becoming insufficient and changing them can become a frequent activity. The middle of the three rom sockets at the front right-hand side of the Master circuit board accepts a 16k rom or eprom, appearing in slot eight.

Using links 18 and 19, each of the sockets in front and behind can be configured either as 32k ram or to accept 16k or 32k roms – with the loss of 32k ram in each case. When configured as 32k ram, the socket behind rom eight is represented in slots seven and six, that in front as five and four.

Similarly with 32k roms in the sockets, slots 4 to 7 are fully utilised. However most commercially available roms are 16k and with this sort inserted, slots six and four cannot be used. Table I should make these trade-offs easier to understand.

The Morley Electronics' AA rom board allows further expansion of the available space. It is sturdily constructed and contains four 32k and eight 16k rom sockets with a controller chip supplied.

Installation is easy and described well in the eight page manual. It fits into the back socket and half of the middle socket of the three internal sockets at the right-hand side and connects by plugged fly leads to links 18 and 19. This in effect takes up the three slots which are reallocated to the board itself.

This site is the same as that for Econet, so the two are physically incompatible. The zero page locations used for command workspace are official but the use of cmos ram – allocated for the Econet system – is not.

The board does not provide extra rom banks which are automatically initialised on start up.

The control rom appears on the rom list as MASTERboard in slot eight and the board itself acts as a sort of library of roms which are selectively paged into rom slots four to seven as required.

On the board the eight 16k rom sockets – which also accept 8k roms or pseudo-32k devices – are arranged in pairs or banks. Each has equal priority, while the right-hand slot of each has a higher priority than its partner on the left. Any 16k roms are therefore fitted in pairs – useful if two go naturally together such as the View or Inter series.

Roms which clash can be placed in different banks and selected separately. The four 32k slots – which also accept 16k roms, though with the loss of one half of the slot – each form one bank. So there can be a total of 12 roms on the board – *LBOARD lists them all.

Using **LO <Morley board bank number>* you can page roms into slots four and five while **HI <Morley board bank number>* puts them in slots six and seven, with the usual loss of ram. The

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BBC Master					Morley board		
Board socket	**Ram**	**Rom**		**Rom no.**	**Rom**		**Ram**
IC27	–	–	16k	8	Morley board selectively paged from board		
IC37	32k	32k	16k	7	16k	32k	32k
			–	6	16k		
IC41	32k	32k	16k	5	16k	32k	32k
			–	4	16k		

Table I: Selections available with and without the board

Morley rom banks	Available space	Morley rom banks	Available space
bank 0	16k 16k	bank 4	32k or 1 x 16k
bank 1	16k 16k	bank 5	32k or 1 x 16k
bank 2	16k 16k	bank 6	32k or 1 x 16k
bank 3	16k 16k	bank 7	32k or 1 x 16k

*Any bank may be inserted into either rom slots 7/6 (*HI <bank no.>) or slots 5/4 (*LO <bank no.>). With 32k rom in bank 4-7, the image is split to 16k in each of rom slot 7/6 or 5/4. With 16k rom in bank 4-7, slot 6 or 4 remains empty. *HI R allocates 7/6 to 32k ram and *LO R allocates 5/4 to 32k ram.*

Table II: Banked system of rom board

SUMMING UP

On the whole this is an excellent extension to the usual Master rom/ram selections with full utilisation of rom slots four to seven. But you still can't have the ram as well, and it is incompatible with Econet.

◀ From Page 109

difference is that rom slots 4 and 6 are not lost to use by inserting 16k roms, and there is no need to switch links 18 and 19 when interchanging from rom to ram. Table II will give you a better idea of the available options.

An undocumented command *RB produces a screen layout of the board contents and the facility to page rom banks into HI or LO slots by pressing the appropriate letter identification of each bank. The slots can be allocated as ram banks by using *HI R, *LO R or from *RB. The need for a Control+Break after selection is still necessary for roms that need to grab memory.

The board works satisfactorily with the Tube on or off, but there was a problem with the way the master rom uses the cmos ram to store details of which roms are switched in. Initially, when the control rom was configured to be compatible with Computer-Lock it was not compatible with the 6502 co-processor.

The replacement rom seems to have resolved this. Morley assures me that future versions – and indeed some older ones – will be fully compatible with the Tube, though it makes sense to ensure that you get hold of the right one for your system – either Tube compatible or Computer-Lock compatible. The manual makes no mention of this.

The only other application on the Morley rom is a DFS/ADFS file copy routine which works in both directions.

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Naughty screen grabber strikes

I HAVE recently been getting the file core error on an Archimedes 310 with Risc OS. It often occurs when I'm using the fill options in Pro-Artisan and it's very annoying to find it is impossible to save a picture when I've spent a long time on it.

The manuals are not very helpful and only say reset the machine. Could you explain more about this error, what causes it and how to prevent it?

Unfortunately the problem always occurs when I'm using the Snapshot program from your December 1988 issue. Also when saving more than one screen – with Arthur – large black strips appear in various places along the display.

If it is at all possible to upgrade this program for Risc OS could you please explain how? Also please show how to add an extra line so that before a screen is saved the disc is re-mounted. This would then allow the use of an unprotected blank disc on which to save screens. – **Chris Kent, Wokingham, Berks.**

● The FileCore module contains all the mid-level routines for an ADFS-like filing system and is used by the ADFS, NetFS and RamFS.

You could even design your own filing system using it, all you need is the user interface and the media accessing primitives. The screen grabber was originally written for the Arthur OS and, as it was a little bit naughty in the way it worked, there have been sufficient changes to make it function incorrectly.

Update updated

I HAVE discovered a minor problem when using my Update program which was published in the August 1989 issue of The Micro User. *It only occurs with early versions of ATS, not with the GIS ATS – all versions – or BBC ATS versions 3.0 and 3.1 and the problem lies in the display routine included to overcome errors in these early roms.*

Unfortunately the program alters the page in memory

Turn to Page 112 ▶

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Make a date with View

MUCH is often made of the ability of View 3.0 – in the Master – to enter the current date into letters or documents using |D in association with a margin command such as RJ.

The problem with this approach is that only the |D, rather than the actual date, is retained in the document.

Thus there is no record of when the document was actually produced and, if a further copy is printed at a later date, it will show the new date rather than being a true copy of the document with its original date.

If entry to View is initiated via a !BOOT file, which is often the case in order to set up the printer, force lower case operation, load a default template file and so on, it is a simple matter to include extra statements in this !BOOT file to transfer the date – permanently – into the current document.

If the template file already contains |D, a function key can be defined to replace the |D with the date, extracted from the full TIME$ string while still effectively in Basic. This function key can then be activated with an FX command, once the command mode of View has been entered, provided the FX command is the last command of the !BOOT file.

This is best illustrated with an actual example. First create a template letter start as illustrated:

My Street
Any Town
County, Postcode

Tel: 0123 4567

RJ |D

Dear

The following !BOOT file will set up the printer, set up View, replace the |D with the actual date, and then enter View:

```
*BASIC
*FX15,1
VDU2,1,27,1,64,1,27,1,69,1
,27,1,73,1,1,3
*SHADOW
MODE 3
VDU19,1,3,0,0,0
OSCLI("KEY10 CHANGE/||D/"+
MID$(TIME$,5,11)+"/|M"+"S
^Z|M")
*WORD
*FX202,48
PRINTER KAGA
LOAD DUMMY
*FX 138,0,138
```

Function key 10 is chosen as, hopefully, the Break key will not be pressed while in View. Any function key could have been used, but the use of key 10 also leaves the function keys free for use in the edit using Control+Shift+fkey – provided an FX228,1 has been issued.

*This function key definition not only replaces the |D in the document with the date, but also uses the SEARCH command to enter the text mode of View as it is not possible to simulate Escape in View 3.0 by issuing *FX125.*

Acorn recommends using SEARCH ^? to enter View edit mode with the cursor on the first space. In the example given here, a hard space is placed two positions to the right of Dear in the dummy letter and S ^Z then enters edit mode with the cursor set on this – ready to enter the name of the addressee (which will actually overwrite the hard space).

This hard space is initially produced by entering any unique character such as @ and then, using CHANGE @ ^Z, it is converted into a hard space.

The dummy letter must then be resaved for future use. The only reason for using this hard space instead of any other character is that it does not show on the screen and even if it does not get overwritten it will only print out as a space. – **D. Gibbons, Wantage, Oxon.**

How the !BOOT file works

*BASIC	Ensures that Basic is in control.
*FX15,1	Flushes the current input buffer to be on the safe side.
VDU2...	Sets up the printer according to personal preference.
*SHADOW	Gives maximum memory space for View documents.
MODE 3	Gives an 80-column display and ensures SHADOW is invoked.
VDU19...	Sets up coloured text (yellow in this case).
OSCLI...	Defines function key 10 _ note use of ||D.
*WORD	Enters View command mode
*FX202,48	Forces lower case 'typewriter' mode.
PRINTER KAGA	Loads the printer driver.
LOAD DUMMY	Loads the default template file.
*FX138,0,138	Activates function key 10.

◀ **From Page 111**

for display purposes before carrying out the CRC. The result is that this is always thought to be in error, and no updates will be reported.

The cure is to delete line 1140 and make these changes:

```
  40 REM Version 1.10
 1060 LOCALrow%,mag%,a%,r%
 1065 DIM r% 41
 1110 FORa%=(s%+2)TO(s%+41)
:r%?(a%-s%-2)=(?a%)OR&80:NE
XT
 1120 r%?40=&D
 1130 row$(row%=$r%
```

With this change, you can keep track of changes even if you still have an early version of the ATS rom. – **Jeremy Brayshaw, London W12.**

Better video recorder link

HAVING seen the Captions Utility in the May issue, there are a few things I would like to point out about some problems I had recording from my BBC Micro to a video recorder.

Firstly, I experienced interference when using the UHF lead. This was caused by the fact that the BBC Micro and VCR both had the output frequency tuned to about Channel 36. I solved that by adjusting the output of my BBC Micro and retuning the VCR.

Secondly, although my micro's video signal is only black and white, there is a link on the circuit board left of the modulator in the form of two soldered pads labelled S39. If this link is made the video signal appears in colour – issue 4 boards upwards.

Thirdly, the video signal on some BBC Micros may not be suitable for certain older VCRs. Although I got a good picture when recording, the playback was totally unacceptable on my machine, but I did try it on a friend's newer one and got a very good result. – **Peter Doe, Edinburgh.**

Emulating Cobol

YOU may be interested to know that Utah Cobol works on the Archimedes under the PC emulator. The software is written by Ellis Computing, Nevada, and I bought this compiler, editor and manual from Advantage, 56 Bath Road, Cheltenham GL53 7HJ.

It supports 90 per cent of Cobol commands and at under £40 it is good value for people who want to learn this business-oriented language.

I would like to know where I can get a copy of the mathemagical game L for my Archimedes – **Peter Barry, Chalfont St. Peter, Bucks.**

● The Archimedes version of L costs £13 – the same as the one for the 8 bit BBC Micro version – and is available from The Association of Teachers of Mathematics, 7 Shaftesbury Street, Derby DE3 8YB. Telephone: 0332 46599.

£10 Prize letter

I FOUND the sideways ram autosave utility in your July issue most interesting and I am keen to develop the concept further. It states that lines 200 to 1240 create the sideways ram header and command recognition codes while lines 1250 to 2540 create the utility.

It then goes on to say "...you can easily modify the interpreter to add new star commands..."

I would like to incorporate a number of utilities into sideways ram/rom images, for example, Get It Right!

Unfortunately I am not adept enough at programming to be able to modify the program published, and would welcome any suggestions as to how this might be done. – **David M Pett, St Lawrence, Jersey, Channel Islands.**

● Extending the utilities available in the program you mention is enough for a whole article – or possibly two. But we are looking into the possibility of providing a sideways ram version of the checksum program.

What day is it?

WHILE I was writing a program recently I required a procedure to calculate the number of days elapsed between two dates, and came up with a routine similar, albeit written in Pascal, to that of Graham Kendall's published in your August issue.

However, for my application I also needed to know which day of the week a particular date fell on, and this can easily be found from these routines.

Since day 0 – 1 Jan 1900 – was a Sunday it follows that day 1 was a Monday, day 2 a Tuesday and so on. Therefore all that is required to work out which day a date falls on is to take the result of Graham's procedure MOD7. This will give a number from 0 to 6 with 0 corresponding to Sunday, 1 to Monday and so on through to 6 for Saturday.

This works for any date which Graham's routine can convert to an integer. – **K.J. Trickey, Fakenham, Norfolk.**

Searching for the answer

WITH reference to your reply to Ellen Perry's letter in your August issue I also have the same problem with the Card Index program in the May issue. I have made the alteration you suggest to line 660 but this doesn't cure the problem.

The Search parameter does not work, but all the others do. Can you help? – **Dr P. E. Dipple, Reading, Berks.**

● Unfortunately the correction for the card index progam didn't go quite far enough. The help we offered cured the problem in some circumstances, but was only half the solution. The full remedy is to change the comparison in line 660 to >= thus making it read:

```
  60 IF LENj$>=LENt$ m%=m%
OR INSTR(j$,t$)
```

This check exists to avoid

Archimedes games

HERE is a method to make Fred Drip of July 1989, Archimedes compatible Delete lines 40 and 210 to 240 then add or change the following:

```
    1 REM > FREDRIP
   50 SOUND ON
   60 VOICES 2
   70 *CHANNELVOICE 1 1
   80 *CHANNELVOICE 2 8
   90 DIM code &40
  321 PROCdelay(40)
 2940 U%=-1:FOR x%=0 TO 2
 STEP 2:P%=code
 2950 [OPT x%:MOV R0,#135
:SWI "OS_Byte"
 2960 ADR R2,mem%:STR R1,
[R2]
 2961 MOV PC,R14:.mem%:]:
NEXT:ENDPROC
```

Perform three global replaces as follows:

Search for	Replace with
&70	mem%
CALL&80	CALL code
CALL &80	CALL code

Also, in all the sound statements where the channel number is zero change it to two, otherwise change it to one, alter the second number to -15 and multiply the last number by 10 in every case.

The Gate of August 1989 works perfectly on the Archimedes series but it is too fast so insert this line:

```
321 FORslow=0TO1000:NEXT
```

Finally, Five Alive – June 1989 – has an inbuilt cheat: Press H during the game to reveal it. – **William Haden, Co. Down, N.Ireland.**

the known INSTR bug in Basic I which will crash the program if the variable *t$* is longer than *j$*.

Graphical Archimedes

I HAVE written a simple, yet striking, graphical display for the Archimedes. It rapidly constructs a range of fast moving, ever changing, line displays. To jump from one to another simply press the spacebar. The program works by drawing lines between sinusoidal and fixed points in a cyclic fashion.

The stepping distances greatly alter the characteristics of the display and so subtle changes in the listing can cause dramatic effects. Some variations have been included in the main loop in lines 160 to 210:

```
   10 REM Graphical line d
isplay
   20 REM by Daniel A. Wil
son
   30 REM (c) The Micro Us
er
   40 REM For Archimedes
   50 REM (runs on B, M128
 etc
   60 REM  but does so slo
wly)
   70 MODE0
   80 REPEAT
   90 MainLoop=1:jumpdist=
1:Xshift=500:Yshift=500:Sca
ler=500
  100 REPEAT
  110 jumpdist=1
  120 REPEAT
  130 FOR Angle=1 TO 1000
STEP jumpdist
  140 X=(SIN(Angle)*Scaler
)+Xshift:Y=(COS(Angle)*Scal
er)+Yshift
  150 IF INKEY(-99) GOTO 2
30
  160 IF MainLoop=1 PLOT 6
9,500,500:PLOT 14,X,Y
  170 IF MainLoop=2 PLOT 6
9,500,500:PLOT 86,X,Y
  180 IF MainLoop=3 PLOT 6
9,X*.5,Y*.5:PLOT 14,X,Y
  190 IF MainLoop=4 PLOT 6
9,X*.5,Y*.5:PLOT 86,X,Y
  200 IF MainLoop=5 FOR L=
0.25 TO 2 STEP .25:PLOT 69,
X*L,Y*L:PLOT 14,X,Y:NEXT
  210 IF MainLoop=6 PLOT 6
9,X*.35,Y*.35:PLOT 14,X,Y
  220 NEXT Angle
  230 jumpdist=jumpdist+1
  240 UNTIL jumpdist=10
  250 CLS
  260 MainLoop=MainLoop+1
  270 UNTIL MainLoop=7
  280 UNTIL FALSE
```

The number of displays possible is infinite and the routine is written so that it is simple to alter.

The program will run on an 8 bit BBC Micro but does so very slowly – thus losing some of the striking effects. One remedy is to reduce the size of Angle in line 130 from 1000 to 100, but this means that only a tenth of the lines are drawn, leaving large gaps in the graphics. – **Daniel A. Wilson, Westbury-on-Trym, Bristol.**

Network notes

I AM a sixth form student at Mirfield High School and would like to make a number of comments about Econet networks. I've spoken to many people from all over the country and have reached several conclusions.

Care is needed as Econet is not a secure environment, and it is possible to do many illegal things.

For example, if anybody with privileged access is careless and logs on to an unprotected station or forgets to clear the memory of theirs after they have used it, they may find that half an hour later the whole school has privileged abilities.

The Econet may be considered reasonably fast when there are only 20 BBC Micros using it, but at our school there are 27 and three Archimedes.

They are all used for word processing, databases and spreadsheets throughout every day and consequently the access time to the filestore is considerable.

As the year progresses it gets longer as there are gaps to be filled when other programs or files are deleted. Our network has been known to crash up to seven times a day due to the heavy workload. This occurrence has been reduced by better disc management – the deletion of all scratch files.

Due to the colossal size of software for the Archimedes, when two or three are loading a package, filestore timeout errors. – Station x not listening – *often occur on both the Archimedes and the BBC Micros.*

This problem has been overcome by staggering the loading of such packages. – **Nicholas Barnes, Mirfield, W. Yorks.**

Ram board reassurance

IN the July issue of The Micro User *N.Reed of Huddersfield reported a problem with the 32k Watford ram board. Having had the same trouble myself, I can offer the following reassurance and solution:*

Neither the board nor Interword is at fault. It is simply a compatibility problem. Every time you wish to load an incompatible piece of software enter:

```
*RAMOFF
```

Then load – or Boot – as normal. To re-activate the board you can type:

```
*RAMON
```

or perform a hard reset. It's easy. – **Richard J. Hesketh, Fleetwood, Lancs.**

Handling a bit more

IN the July 1989 issue of your magazine you published an Archimedes program I wrote – the Fulllmed utility – which allows the assembly of 32 bit constants.

While it works, the utility isn't as tolerant as it could, or should, be: It can't handle lower case mnemonics or leading spaces in the mnemonic string.

To correct this, change the program to include the lines:

```
 615 WHILE LEFT$(instr$,1)
=" ":instr$=MID$(instr$,2)
:ENDWHILE
 620 $ins%=instr$:temp%=0:
WHILE ins%?temp%<>32:ins%?
temp%=ins%?temp% AND &DF:t
emp%+=1:ENDWHILE:instr=$in
str$
```

Once this has been done the program can handle leading spaces and mnemonics in either case, but you must separate the mnemonic from its arguments by a space. – **Ian Kirk, Derbyshire.**

Filename remarks

On some BBC Micros it is possible to put the name of a program into the first REM statement – like 10 REM >$.MyProg – and save it automatically using:

```
SAVE$(PAGE+8)
```

The lazy programmer is even better served by the following short program. It generates a machine code file called AS which dumps the above command into the keyboard buffer.

*Now all you have to do is type *AS and the program you are developing will be saved automatically.*

```
  10 REM>$.AS-Src
  20 :
  30 FORpass=0TO2STEP2
  40 P%=&900
  50 [OPTpass
  60.as1 LDA#21:JSR&FFF4
  70 LDA#138:LDX#0:LDY#ASC"
0":JSR&FFF4
  80 LDY#ASC".":JSR&FFF4
  90 LDY#13:JSR&FFF4
 100 LDX#0
 110 .as2 LDAtex,X:INX:STX&
70:PHA
 120 LDX#0:TAY:LDA#138:JSR&
FFF4
 130 LDX&70:PLA:CMP#13:BNEa
s2
 140 RTS
 150 .tex EQUS"SA.$(PA.+7)"
:?EQUB13
 160 ]:NEXT
 170 $="*SAVE AS"+STR$~as1+
"+STR$~P%
 180 PRINTS$
 190 $&700=S$:X%=0:Y%=7:CAL
L&FFF7
 200 END
```

– **Max Edwards, Faulkland, Bath.**

● Even four key presses are too many – add a second line to your program:

```
15 *KEY0 *AS|M
```

Then when you've run it once you just need to press one key to perform a save.

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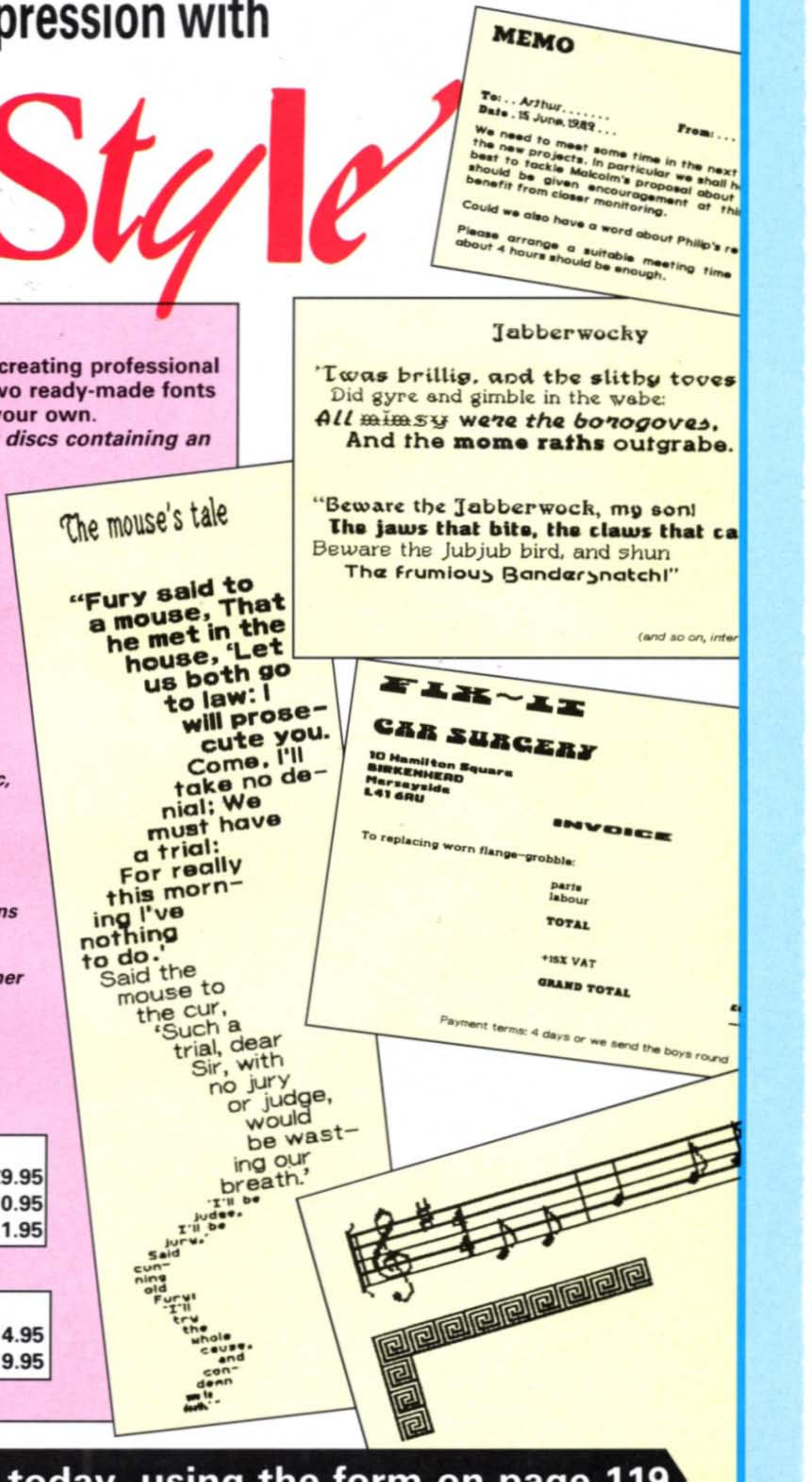

MEMO

To: .. Arthur.......
Date . 15 June 1989 ...
From: ...

We need to meet some time in the next
the new projects. In particular we shall h
best to tackle Malcolm's proposal about
should be given encouragement at thi
benefit from closer monitoring.

Could we also have a word about Philip's re

Please arrange a suitable meeting time
about 4 hours should be enough.

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

(and so on, inter

The mouse's tale

"Fury said to
a mouse, That
he met in the
house, 'Let
us both go
to law: I
will prose-
cute you.
Come, I'll
take no de-
nial; We
must have
a trial:
For really
this morn-
ing I've
nothing
to do.'
Said the
mouse to
the cur,
'Such a
trial, dear
Sir, with
no jury
or judge,
would
be wast-
ing our
breath.'
'I'll be
judge,
I'll be
jury.'
Said
cun-
ning
old
Fury!
'I'll
try
the
whole
cause,
and
con-
demn
you to
death.'"

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Keyword *(see page 118)*

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Available For:	MO2	Book	Example Disc	Price	Code	Please Tick
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(see page 26)

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(See page 20)

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◀ From Page 106

```
 1630 FOR N%=0 TO max%
 1640 INPUT#F,style%(N%),type%(N%),data$(N%)
 1650 NEXT N%
 1660 CLOSE#0
 1670 PROCparams
 1680 ENDPROC
 1690 :
 1700 DEFPROCsave
 1710 VDU 28,0,24,39,23
 1720 CLS
 1730 REPEAT
 1740 INPUT"File name to save ";F$
 1750 UNTIL LENF$<8
 1760 IF F$="" ENDPROC
 1770 F=OPENOUT(F$)
 1780 PRINT#F,max%,pitch%,height%,pmargin%,maxlen%
 1790 FOR N%=0 TO max%
 1800 PRINT#F,style%(N%),type%(N%),data$(N%)
 1810 NEXT N%
 1820 CLOSE#0
 1830 ENDPROC
 1840 :
 1850 DEFPROCedit
 1860 *FX15,0
 1870 A%=0:B%=0
 1880 PROCtotlf
 1890 PROCdisplay
 1900 REPEAT
 1910 PROCcursor
 1920 PRINT TAB(A%+inset%(type%(B%)),B%);
 1930 PROCkeyin
 1940 UNTIL I%=129
 1950 I%=0
 1960 ENDPROC
 1970 :
 1980 DEFPROCkeyin
 1990 REPEAT
 2000 I$=INKEY$(0):I%=ASC(I$)
 2010 UNTIL I$<>""
 2020 IF I%>126 OR I%<32 PROCctrl:ENDPROC
 2030 IF A%>=len%(type%(B%)) ENDPROC
 2040 PROCmidstr
 2050 A%=A%+1
 2060 ENDPROC
 2070 :
 2080 DEFPROCctrl
 2090 IF INKEY(-1)PROCshift:ENDPROC
 2100 IF I%=139 A%=0:B%=B%+(B%>0):ENDPROC
 2110 IF I%=138 OR I%=13 A%=0:B%=B%-(B%<maxlines%):ENDPROC
 2120 IF I%=136 A%=A%+(A%>0):ENDPROC
 2130 IF I%=137 A%=A%-(A%<LENdata$(B%)):ENDPROC
 2140 IF I%=127 I$=" ":PROCmidstr:A%=A%+(A%>0):ENDPROC
 2150 IF I%>129 PROCselect
 2160 IF I%=9 AND A%< LENdata$(B%)-10 A%=A%+10
 2170 ENDPROC
 2180 :
 2190 DEFPROCshift
 2200 IF I%=136 PROCdel
 2210 IF I%=137 PROCins
 2220 IF I%=138 PROCinsline
 2230 IF I%=139 PROCdelline
 2240 ENDPROC
 2250 :
 2260 DEFPROCmidstr
 2270 data$(B%)=LEFT$(data$(B%),A%)+I$+RIGHT$(data$(B%),LEN(data$(B%))-(A%+1))
 2280 data$(B%)=FNfixlen(data$(B%))
 2290 PRINT TAB(inset%(type%(B%)),B%)data$(B%);
 2300 ENDPROC
 2310 :
 2320 DEFPROCdel
 2330 data$(B%)=LEFT$(data$(B%),A%)+RIGHT$(data$(B%),LENdata$(B%)-(A%+1))+" "
 2340 data$(B%)=FNfixlen(data$(B%))
 2350 PRINT TAB(inset%(type%(B%)),B%)data$(B%)
 2360 ENDPROC
 2370 :
 2380 DEFPROCins
 2390 IF A%=maxlen% ENDPROC
 2400 data$(B%)=LEFT$(data$(B%),A%)+" "+RIGHT$(data$(B%),LENdata$(B%)-A%)
 2410 data$(B%)=FNfixlen(data$(B%))
 2420 PRINTTAB(inset%(type%(B%)),B%)data$(B%)
 2430 ENDPROC
 2440 :
 2450 DEFPROCinsline
 2460 FOR N%=max% TO B%+1 STEP-1
 2470 data$(N%)=data$(N%-1)
 2480 type%(N%)=type%(N%-1)
 2490 style%(N%)=style%(N%-1)
 2500 NEXT N%
 2510 data$(B%)=clear$
 2520 type%(B%)=1
 2530 style%(B%)=1
 2540 PROCtotlf
 2550 PROCdisplay
 2560 ENDPROC
 2570 :
 2580 DEFPROCdelline
 2590 FOR N%=B% TO max%-1
 2600 data$(N%)=data$(N%+1)
 2610 type%(N%)=type%(N%+1)
 2620 style%(N%)=style%(N%+1)
 2630 NEXT N%
 2640 data$(max%)=clear$
 2650 PROCtotlf
 2660 PROCdisplay
 2670 ENDPROC
 2680 :
 2690 DEFPROCselect
 2700 IF I%=130 AND style%(B%)<>3 type%(B%)=1
 2710 IF I%=131 type%(B%)=2
 2720 IF I%=132 type%(B%)=3
 2730 IF I%=133 type%(B%)=4
 2740 IF I%=134 style%(B%)=1
 2750 IF I%=135 style%(B%)=2
 2760 IF I%=140 AND type%(B%)<>1 style%(B%)=3
 2770 PROCtotlf
 2780 data$(B%)=FNfixlen(data$(B%))
 2790 PROCdisplay
 2800 A%=0:PRINT TAB(inset%(type%(B%)),B%);
 2810 ENDPROC
 2820 :
 2830 DEFPROCmark
 2840 VDU 28,0,24,2,2
 2850 CLS
 2860 FOR N%=0 TO maxlines%
 2870 PRINT TAB(0,N%);type%(N%);" ";style%(N%);
 2880 NEXT N%
 2890 ENDPROC
 2900 :
 2910 DEFPROClabel
 2920 totlfp%=0
 2930 PROCpcode(71,0)
 2940 FORB%=0 TO maxlines%
 2950 IF INKEY(-99) THEN PROCadjust
 2960 IF abort%=TRUE B%=maxlines%+1:GOTO 3400
 2970 REM cancel styles:
 2980 PROCpcode(53,0)
 2990 PROCpcode(45,0)
 3000 PRINT TAB(pmargin%);
 3010 REM set styles:
 3020 IF style%(B%)=2 PROCpcode(52,0)
 3030 IF style%(B%)=3 PROCpcode(45,1)
 3040 ON type%(B%) GOTO 3070,3170,3250,3320
 3050 :
 3060 REM con superscript (type 1)
 3070 PROCpcode(15,0):REM condensed
 3080 PROCpcode(83,0):REM set super
 3090 PROCpcode(51,lf%(1)):REM linespc
 3100 totlfp%=totlfp%+lf%(1)
 3110 PRINTdata$(B%)
 3120 PROCpcode(84,0):REM canc super
 3130 PROCpcode(18,0):REM canc cond
 3140 GOTO3400
 3150 :
 3160 REM condensed (type 2)
 3170 PROCpcode(15,0):REM condensed
 3180 PROCpcode(51,lf%(2)):REM linespc
 3190 totlfp%=totlfp%+lf%(2)
 3200 PRINTdata$(B%)
 3210 PROCpcode(18,0):REM canc cond
 3220 GOTO3400
 3230 :
 3240 REM emphasised (type 3)
 3250 PROCpcode(69,0):REM emph
 3260 PROCpcode(51,lf%(3)):REM linespc
 3270 totlfp%=totlfp%+lf%(3)
 3280 PRINTdata$(B%)
 3290 PROCpcode(70,0):REM canc.emph
 3300 GOTO3400
 3310 :
 3320 REM double width (type 4)
 3330 PROCpcode(69,0):REM emph
 3340 PROCpcode(87,1):REM dbl wdth
 3350 PROCpcode(51,lf%(4)):REM linespc
 3360 totlfp%=totlfp%+lf%(4)
 3370 PRINTdata$(B%)
 3380 PROCpcode(70,0):REM canc.emph
 3390 PROCpcode(87,0):REM canc.dbl
 3400 NEXT B%
 3410 ENDPROC
 3420 :
 3430 DEFPROCpcode(a%,b%)
 3440 VDU 27,a%,b%
 3450 ENDPROC
 3460 :
 3470 DEFPROCadjust
 3480 *FX3,0
 3490 VDU 7
 3500 REPEAT UNTIL NOT INKEY(-99)
 3510 *FX21,0
 3520 CLS
 3530 PROCtitle
 3540 INPUT'"ABORT Y/N";q$:IF q$="Y" OR q$="y" THEN abort%=TRUE:ENDPROC
 3550 PRINT'"printer margin is ";pmargin%
 3560 REPEAT
 3570 INPUT'"new margin";pmargin$
 3580 IF pmargin$="" THEN exit%=TRUE
 3590 pmargin%=VAL(pmargin$)
 3600 UNTIL (pmargin% >=0 AND pmargin% <100) OR exit%=TRUE
 3610 exit%=FALSE
 3620 CLS:PROCtitle
 3630 PRINT TAB(0,8)"Printing label ";P%;" of ";nlabels%
 3640 *FX3,10
 3650 ENDPROC
 3660 :
 3670 DEFPROCtotlf
 3680 REPEAT
 3690 PROCcount
 3700 IF totlf%< height% maxlines%=maxli
nes%+1:GOTO3720
 3710 IF totlf%> height% maxlines%=maxli
nes%-1
 3720 UNTIL totlf%<=height% AND totlf%>h
eight%-30
 3730 PROCcount
 3740 ENDPROC
 3750 :
 3760 DEFPROCcount
 3770 totlf%=0
 3780 FOR N%=0 TO maxlines%
 3790 totlf%=totlf%+lf%(type%(N%))
 3800 NEXT N%
 3810 ENDPROC
 3820 :
 3830 DEFPROCprint
 3840 abort%=FALSE
 3850 PROCtitle
 3860 INPUT'TAB(8)"Enter number of label
s "nlabels%
 3870 IFnlabels%=0 ENDPROC
 3880 PRINT'"Hold SPACE to adjust/abort"
 3890 FOR P%=1 TO nlabels%
 3900 IF abort%=TRUE P%=nlabels%+1:GOTO3
950
 3910 PRINT TAB(0,8)"Printing label ";P%
;" of ";nlabels%
 3920 *FX3,10
 3930 PROClabel
 3940 PROCpcode(74,pitch%-totlf%):REM  t
urn to next label
 3950 *FX3,0
 3960 NEXT P%
 3970 ENDPROC
 3980 :
 3990 DEFPROCcursor
 4000 VDU 23;10,3*(4-type%(B%));0;0;0;
 4010 ENDPROC
 4020 :
 4030 REM ERROR
 4040 ON ERROR OFF
 4050 *FX4,0
 4060 *FX3,0
 4070 MODE7
 4080 IF ERR<>17 THEN 4110
 4090 *FX 153,0,83
 4100 PROCfile
 4110 REPORT:PRINT" at line ";ERL
 4120 END
 4130 :
 4140 DEFFNfixlen(line$)
 4150 REPEAT
 4160 line$=line$+" "
 4170 UNTIL LEN line$>len%(type%(B%))
 4180 line$=LEFT$(line$,len%(type%(B%)))
 4190 =line$
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 8AFC 8
  60 = 5864 8
  70 = DEBB 2
  80 = BFBA C
  90 = 8AFC 7
 100 = D5FF 4
 110 = 46EF 9
 120 = 4AC9 8
 130 = C022 8
 140 = 1404 6
 150 = F858 3
 160 = FD2E 9
 170 = 9719 A
 180 = E92F 3
 190 = 917F 5
 200 = 9FC9 E
 210 = 8917 A
 220 = EFAF F
 230 = CA80 9
 240 = 1048 F
 250 = 5852 9
 260 = 33D9 B
 270 = 3DBD 2
 280 = FAE2 B
 290 = ED0F 5
 300 = 9719 1
 310 = 344C 7
 320 = 4553 3
 330 = 57D3 9
 340 = AC97 1
 350 = 72D3 1
 360 = 86FA 2
 370 = 947A 6
 380 = 6F3E 8
 390 = F417 5
 400 = E383 4
 410 = 6D4B A
 420 = C97E 3
 430 = 2031 5
 440 = 4999 9
 450 = D31E 5
 460 = EC50 9
 470 = E98D A
 480 = C07F 1
 490 =  1BF 9
 500 = A2A3 3
 510 = D482 3
 520 = 15AD E
 530 = 89AE E
 540 = 397F 5
 550 = E756 6
 560 = 2A2E 9
 570 = 24C3 0
 580 = CC57 2
 590 = DF67 F
 600 =  142 E
 610 = B3B2 F
 620 = 61AE 9
 630 = FF56 4
 640 = ED0F C
 650 = 9719 E
 660 = F931 9
 670 = A929 2
 680 = ED0F F
 690 = 9719 0
 700 = 5F7C 1
 710 = 2B9A 8
 720 = 5255 A
 730 = 7FB5 A
 740 =  142 1
 750 = 3FE8 B
 760 = 61AE 8
 770 = E082 1
 780 = 5CBF 9
 790 = BFBA 8
 800 = 99F3 0
 810 = C401 B
 820 = E68A 2
 830 = 529A D
 840 = 9100 C
 850 = B32F 5
 860 = 21A4 C
 870 = 5DB3 D
 880 = 5CBF 3
 890 = C9C3 3
 900 = 8CB1 9
 910 = ED0F 7
 920 = 9719 8
 930 = 6605 2
 940 = 48CB E
 950 = ED0F C
 960 = 9719 1
 970 = C225 B
 980 =  7F8 6
 990 = 405E 7
1000 = 6FD2 0
1010 = 8417 0
1020 =    0 0
1030 =  42C 1
1040 = 6C27 7
1050 = 7A16 8
1060 = 92D2 D
1070 = BF0C E
1080 = 61AE 7
1090 = ED0F 2
1100 = 9719 5
1110 = 2AA8 B
1120 = 5255 F
1130 = 6D23 6
1140 = 7FB5 2
1150 = 16E3 A
1160 = A8B2 4
1170 = B8F0 9
1180 = 4826 D
1190 = BFBA F
1200 = BFBA 8
1210 = 8C40 C
1220 = F6CB 6
1230 = 510E 8
1240 = 805E 4
1250 = BFBA A
1260 = F28A 0
1270 = A702 B
1280 = F453 F
1290 = 2226 1
1300 =  5FD 3
1310 = BFBA 0
1320 = 2226 C
1330 =  E12 E
1340 = 1982 B
1350 = 8777 1
1360 = C02E 2
1370 = BFBA A
1380 = 5516 6
1390 = F5EF A
1400 = 1E34 1
1410 = 5D20 6
1420 = ED0F C
1430 = 9719 3
1440 = 98D7 8
1450 = 5255 1
1460 = 2C81 1
1470 = C23E 9
1480 = 99B3 C
1490 = 1B7C 6
1500 = 98F5 2
1510 = 6BA1 6
1520 = ED0F 6
1530 = 9719 6
1540 = 24A1 1
1550 = F08C C
1560 = 7A16 C
1570 = BFBA F
1580 = 1721 A
1590 = 9622 4
1600 = 36C9 E
1610 = 9297 A
1620 = BBEF 6
1630 = CAB6 3
1640 = 8686 4
1650 = 61AE 8
1660 = 9EE3 D
1670 = 89AE 6
1680 = ED0F 8
1690 = 9719 1
1700 = 7A2C 2
1710 = F08C 5
1720 = 7A16 3
1730 = BFBA 3
1740 = 2905 8
1750 = 9622 1
1760 = 36C9 8
1770 = 9A23 1
1780 = 5B02 C
1790 = CAB6 7
1800 = E876 5
1810 = 61AE 0
1820 = 9EE3 6
1830 = ED0F 6
1840 = 9719 2
1850 = BCBF 2
1860 = 6C86 8
1870 = FA3F E
1880 = 45AF 6
1890 = 2F83 2
1900 = BFBA 0
1910 = 8BD6 8
1920 = 2627 E
1930 = 700B E
1940 = 5F79 5
1950 = B547 7
1960 = ED0F B
1970 = 9719 4
1980 = DB6F 9
1990 = BFBA B
2000 = 1181 F
2010 =  F84 4
2020 = BE10 6
2030 = 68FF 4
2040 = 67B3 7
2050 = B760 2
2060 = ED0F D
2070 = 9719 F
2080 = 94F5 A
2090 = 4218 3
2100 = 4DDD 5
2110 = 2EDF 0
2120 = FED3 E
2130 = FDE2 3
2140 = DAED 0
2150 = 4987 C
2160 = 7205 B
2170 = ED0F 3
2180 = 9719 5
2190 =  4B8 F
2200 = 4F4C 8
2210 = 7799 8
2220 = A47D 4
2230 = 8333 F
2240 = ED0F A
2250 = 9719 F
2260 =  732 C
2270 = 1098 4
2280 = 9B34 6
2290 = FF01 0
2300 = ED0F 0
2310 = 9719 0
2320 = 7AE3 E
2330 = 268B E
2340 = 9B34 C
2350 = 18EB A
2360 = ED0F 3
2370 = 9719 3
2380 =  796 C
2390 =  C17 7
2400 = 5E09 B
2410 = 9B34 A
2420 = 2D76 2
2430 = ED0F 1
2440 = 9719 3
2450 = 9C88 2
2460 = A733 3
2470 = 2C40 1
2480 = 7C3E 4
2490 = CC2B 1
2500 = 61AE 7
2510 = 2A2E 1
2520 = C290 3
2530 = A551 F
2540 = 45AF A
2550 = 2F83 2
2560 = ED0F 3
2570 = 9719 7
2580 = D483 7
2590 = 70F0 8
2600 = 9EE0 4
2610 = CE9E D
2620 = 7E8B F
2630 = 61AE 1
2640 = 9853 1
2650 = 45AF 9
2660 = 2F83 3
2670 = ED0F 6
2680 = 9719 5
2690 = 981C 0
2700 = 8B60 8
2710 = 6942 A
2720 = B6C6 D
2730 = 8342 C
2740 = A047 6
2750 = EB45 1
2760 = BE45 A
2770 = 45AF 0
2780 = 9B34 5
2790 = 2F83 4
2800 = A41A 0
2810 = ED0F 9
2820 = 9719 8
2830 = EEDB 6
2840 = 1A64 2
2850 = 7A16 1
2860 = 92D2 9
2870 = 490C 7
2880 = 61AE 4
2890 = ED0F 7
2900 = 9719 D
2910 = A0F7 4
2920 = CC92 5
2930 =  BFC 8
2940 = 5382 9
2950 = E954 5
2960 = C172 E
2970 =    0 E
2980 = A217 3
2990 = 2FDF 9
3000 = A887 E
3010 =    0 E
3020 = 7660 4
3030 = C54C E
3040 = 5987 2
3050 = 9719 7
3060 =    0 7
3070 = DE95 A
3080 = 5BF2 F
3090 = 4F47 7
3100 = AC33 2
3110 = A9E4 D
3120 = 3C26 A
3130 = FFEF 1
3140 = 2084 F
3150 = 9719 5
3160 =    0 5
3170 = DE95 2
3180 = D49B B
3190 = F960 D
3200 = A9E4 3
3210 = FFEF A
3220 = 2084 0
3230 = 9719 0
3240 =    0 0
3250 = 9DFF 2
3260 = A22F 9
3270 = CA51 4
3280 = A9E4 1
3290 = 7023 2
3300 = 2084 3
3310 = 9719 5
3320 =    0 5
3330 = 9DFF 2
3340 = E5C4 0
3350 = F302 A
3360 = 53C6 8
3370 = A9E4 E
3380 = 7023 E
3390 = D2F4 0
3400 = 24C3 0
3410 = ED0F F
3420 = 9719 3
3430 = 2A53 C
3440 = 3B98 C
3450 = ED0F C
3460 = 9719 E
3470 = C400 D
3480 = 7632 A
3490 = CC52 0
3500 = 5EFA D
3510 = 2B9A 1
3520 = 7A16 C
3530 = 5255 A
3540 = AA18 1
3550 = D7A3 E
3560 = BFBA 8
3570 = B0F8 A
3580 =  712 A
3590 = 882F D
3600 = 39F5 5
3610 = 2031 6
3620 = 18DC 5
3630 = E9B6 3
3640 = 2933 0
3650 = ED0F 2
3660 = 9719 8
3670 = EECB B
3680 = BFBA B
3690 = 4500 F
3700 =  A2F 6
3710 = F6CD 3
3720 = F8C0 4
3730 = 4500 0
3740 = ED0F D
3750 = 9719 6
3760 = EE64 E
3770 =  1BF A
3780 = 92D2 4
3790 = 3D0D 6
3800 = 61AE 1
3810 = ED0F 3
3820 = 9719 6
3830 = 10CF 3
3840 = C97E A
3850 = 5255 4
3860 = B017 3
3870 = 13DB 8
3880 = EB03 2
3890 =  F74 A
3900 = 5820 3
3910 = E9B6 1
3920 = 2933 6
3930 =  B93 D
3940 = 5D41 6
3950 = 7632 6
3960 = 41D2 6
3970 = ED0F 9
3980 = 9719 C
3990 = EB57 6
4000 = C62E 6
4010 = ED0F B
4020 = 9719 7
4030 =    0 7
4040 = F4C9 9
4050 = F3A2 3
4060 = 7632 4
4070 = 8AFC 3
4080 = 9F71 5
4090 = DB6C 7
4100 = 7220 6
4110 = 6BDF 9
4120 = FD2E 2
4130 = 9719 C
4140 = 832F 7
4150 = BFBA 8
4160 = FB49 E
4170 = A097 3
4180 = 7E46 C
4190 = 49CE 6
```

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```
  990 DATA 88CC4804,84848,8444084C
 1000 DATA CC8848C8,C810C88C,8C0C4C
 1010 DATA C888C884,44840888,480848C8
 1020 DATA 4C8808
 1030 DATA 104C940C,D04C0854,8848D090
 1040 DATA 488C8,C848C84C,88D40C88
 1050 DATA 901088C8,85408,8480C44
 1060 DATA C890C854,D498084C,440888
 1070 DATA 894D044,48CC0C88,48085CC8
 1080 DATA 489C08
 1090 DATA 1,30,215,46,22,181,97,119,32
 1100 DATA 80,168,136,128,0
 1110 DATA 4,187,64,75,129,184,75,119,1
 1120 DATA 132,64,17,132,189,36,84,4,0
 1130 DATA 5,75,76,72,132,184,4,75,1,119
 1140 DATA 65,139,32,116,40,68,32,34,16
 1150 DATA 0,0
 1160 THEEND
 1170 DEFPROCinit
 1180 PRINTTAB(12,11)"Please Wait"
 1190 ?&72=0:?&73=&30:*TAPE
 1200 VDU23,240,0,3,15,31,63,127,127,255
 1210 VDU23,241,0,192,240,248,252,254,25
4,255
 1220 VDU23,242,255,255,255,127,127,63,3
1,15
 1230 VDU23,243,0,0,0,128,128,192,224,11
2
 1240 VDU23,244,255,255,255,254,254,252,
248,240
 1250 VDU23,245,0,0,0,1,1,3,7,14
 1260 VDU23,246,3,0,0,0,0,0,0,0
 1270 VDU23,247,124,63,31,15,3,0,0,0
 1280 VDU23,248,192,0,0,0,0,0,0,0
 1290 VDU23,249,62,252,248,240,192,0,0,0
 1300 VDU23,250,129,129,129,128,128,128,
128,128
 1310 VDU23,251,15,17,33,65,129,129,129,
129
 1320 VDU23,252,126,126,126,124,120,112,
96,64
 1330 VDU23,253,0,14,30,62,126,126,124,1
26
 1340 VDU23,254,255,255,255,255,255,255,
255,0
 1350 ENVELOPE1,2,-1,1,-1,2,2,2,0,0,0,-1
0,80,80
 1360 ENVELOPE2,3,2,80,-120,16,130,50,-2
5,10,-8,-10,80,80
 1370 ENVELOPE3,3,-1,0,0,246,0,0,0,0,-1,
-3,120,120
 1380 ENVELOPE4,4,1,1,1,1,2,3,0,0,-1,-3,
110,110
 1390 ENVELOPE5,1,-5,-10,-50,255,246,100
,0,0,-1,-3,120,120
 1400 ENVELOPE6,1,226,226,226,60,60,60,0
,0,-1,-3,90,90
 1410 oswr=&FFEE:osby=&FFF4:oswo=&FFF1
 1420 FORL%=0TO2STEP2
 1430 P%=&1100
 1440 [OPT L%
 1450 .ptab LDA#31:JSR oswr:TXA:JSR oswr
 1460 TYA:JMP oswr
 1470 .sc SEC:SBC#10:STA&B00,X:INC&AFF,X
 1480 JMP sc3
 1490 .sc1 LDX#6:LDY#3:JSR ptab:LDX#6
 1500 .sc2 LDA&B00,X:CMP#58:BCS sc
 1510 .sc3 JSR oswr:LDA#8:JSR oswr
 1520 JSR oswr:DEX:BPL sc2
 1530 LDX#16:LDY#3:JSR ptab
 1540 LDA&B08:JSR oswr
 1550 LDX#18:LDY#28:JSR ptab
 1560 LDA&B09:JMP oswr
 1570 .start JSR sc1:JSR sup:JSR key
 1580 LDX#60:JSR wai
 1590 .mlo
 1600 LDX#&8F:JSR ink:BCC nqu
 1610 LDA#19:STA&B32
 1620 LDA#48:STA&B08:JMP dea
 1630 .nqu LDX#&A6:JSR ink:BCC unp
 1640 .pau LDX#&96:JSR ink:BCC pau
 1650 .unp LDX#&AE:JSR ink:BCC son
 1660 LDX#0:JSR soo
 1670 .son LDX#&EF:JSR ink:BCC soff
 1680 LDX#1:JSR soo
 1690 .soff
 1700 LDA#19:JSR osby:LDA&B40:STA&B3F
 1710 .sug LDX&8F:BEQ ddm
 1720 LDA&B34:BNE dmm
 1730 JSR hmm:BEQ dea
 1740 .ddm JSR char:JSR cdir:JSR char
 1750 .dmm JSR hmk:BEQ gk
 1760 JSR dtim:LDA&B32:CMP#19:BNE nrt
 1770 .dea LDA#1:STA&B41:LDX#3:LDY#96
 1780 LDA#3:JSR sou:LDX#50:JSR wai
 1790 JSR pkey:LDX&7D:BEQ cos
 1800 JSR coff
 1810 .cos LDA&B34:BNE cman:JMP sup
 1820 .cman LDX#0:JMP char+2
 1830 .gk LDA#1:STA&B41
 1840 LDX#6:LDY#96:LDA#20:JSR sou
 1850 LDX#90:JMP wai
 1860 .nrt JSR dcu
 1870 LDX&8F:BNE mon:JSR cfk:JSR cfc
 1880 JSR dms:JSR cfel
 1890 .mon DEC&8F:BPL rfm
 1900 LDA#4:STA&8F
 1910 .rfm DEC&B3F:BPL sga:JMP mlo
 1920 .sga JMP sug
 1930 .char LDX&8F:LDA&8A,X:PHA:LDA&85,X
 1940 TAY:LDA&7E,X:TAX:PLA:JMP&2C8C
 1950 .sup LDA#4:STA&8F
 1960 .ncha JSR char:DEC&8F:BPL ncha
 1970 LDA#4:STA&8F:RTS
 1980 .cdir LDX&8F:BNE mmn:JMP man
 1990 .mmn DEC&B4A:LDA&B4A:BNE dmn
 2000 LDA#12:STA&B4A:LDA#1:STA&B41
 2010 LDX&B49:LDY#10:CPX#2:BNE sth
 2020 LDY#50:JMP env
 2030 .sth CPX#3:BNE env
 2040 LDX#0:LDY#110:JSR sou
 2050 LDA#0:STA&B41:LDX#244:LDY#3:LDA#2
 2060 .env JSR sou
 2070 .dmn LDX&8F
 2080 LDA&8A,X:AND#2:EOR&B1E:STA&8A,X
 2090 LDA&B3A,X:BNE anz
 2100 .rbd INC&B36,X:LDA&B36,X:TAY
 2110 LDA&2C07,Y:BNE ned
 2120 LDA&B36,X:SEC:SBC#16:STA&B36,X
 2130 JMP rbd
 2140 .ned AND#63:STA&B3A,X
 2150 .anz LDA&B36,X:TAY
 2160 LDA&2C07,Y:AND#128
 2170 BEQ sxm:INC&7E,X:JMP cym
 2180 .sxm DEC&7E,X
 2190 .cym LDA&2C07,Y:AND#64
 2200 BEQ sym:INC&85,X:INC&85,X:JMP end
 2210 .sym DEC&85,X:DEC&85,X
 2220 .end DEC&B3A,X:RTS
 2230 .ink LDA#&81:LDY#&FF:JMP osby
 2240 .man LDX#&BE:JSR ink:BCC nbl:JSR d
bl:BNE nbl:JSR an:EOR#6:STA&8A:INC&85:IN
C&85:DEC&7E
 2250 .nbl LDX#&9E:JSR ink:BCC nfr:JSR d
fr:BNE nfr:JSR an:EOR#2:STA&8A:DEC&85:DE
C&85:INC&7E
 2260 .nfr LDX#&B7:JSR ink:BCC nbr:JSR d
br:BNE nbr:JSR an:EOR#7:STA&8A:INC&85:IN
C&85:INC&7E
 2270 .nbr LDX#&97:JSR ink:BCC nfl:JSR d
fl:BNE nfl:JSR an:EOR#3:STA&8A:DEC&85:DE
C&85:DEC&7E
 2280 .nfl RTS
 2290 .an LDA&8A:AND#2:RTS
 2300 .dbl LDX&7E:DEX:LDY&85:INY
 2310 JSR ccl:BNE nl
 2320 LDX&7E:DEX:DEX:DEX:DEX
 2330 LDA&85:SEC:SBC#6:TAY:JMP ccl
 2340 .nl RTS
 2350 .dbr LDX&7E:INX:LDY&85:INY
 2360 JSR ccl:BNE nl
 2370 LDA&7E:CLC:ADC#5:TAX
 2380 LDA&85:SEC:SBC#6:TAY:JMP ccl
 2390 .dfl LDX&7E:DEX:DEX:DEX:DEX
 2400 JSR sy11:BNE nl
 2410 LDX&7E:LDA&85:SEC:SBC#18:TAY
 2420 JMP ccl
 2430 .dfr LDA&7E:CLC:ADC#5:TAX
 2440 JSR sy11:BNE nl
 2450 LDX&7E:INX:LDA&85:SEC:SBC#18:TAY
 2460 .ccl JSR&2D0E:CMP#255:JMP nl
 2470 .sy11 LDA&85:SEC:SBC#11:TAY:JMP cc
l
 2480 .key JSR kecu:STX&7C:STY&83
 2490 CPX&7D:BEQ key
 2500 .pkey LDX&7C:LDY&83:LDA#8:JMP&2C8C
 2510 .kecu LDX&B2F:LDA&B1F,X:PHA
 2520 LDY&B20,X:PLA:TAX:INC&B2F:INC&B2F
 2530 LDA&B2F:AND#15:STA&B2F:RTS
 2540 .dcu DEC&B30:BNE dpc:LDA#35:STA&B3
0
 2550 DEC&B31:BNE dpc:LDA&7D:BNE coff
 2560 LDA#27:STA&B31
 2570 .cup JSR kecu:STX&7D:STY&84
 2580 CPX&7C:BEQ cup
 2590 .pcup LDA#10:JMP&2C8C
 2600 .dpc RTS
 2610 .coff LDX&7D:LDY&84
 2620 LDA#0:STA&7D:STA&84
 2630 LDA#35:STA&B30:STA&B31:JMP pcup
 2640 .dtim DEC&B33:BNE dpc
 2650 LDA&B4B:STA&B33
 2660 LDY#31:LDX&B32:JSR&2C47:LDY#6
 2670 .lsti LDA#0:STA(&70),Y:DEY:BPL lst
i
 2680 DEC&B32:RTS
 2690 .djm JSR sup:LDA#0:STA&8F:JMP char
 2700 .cfk LDX&7E:DEX:CPX&7C:BEQ yxk:RTS
 2710 .yxk LDA&85:SEC:SBC#6:TAY
 2720 CPY&83:BEQ yyk:RTS
 2730 .yyk LDA&B05:CLC:ADC#5:STA&B05
 2740 LDA#2:STA&B41:LDX#4:LDY#90
 2750 LDA#3:JSR sou
 2760 LDA&B09:CMP#48:BEQ aks:DEC&B09
 2770 .aks JSR sc1:JSR pkey:JMP key
 2780 .cfc LDX&7E:DEX:CPX&7D:BEQ yxc:RTS
 2790 .yxc LDA&85:SEC:SBC#6:TAY
 2800 CPY&84:BEQ yyc:RTS
 2810 .yyc INC&B04
 2820 LDA#2:STA&B41:LDX#5:LDY#100
 2830 LDA#5:JSR sou
 2840 JSR sc1:LDA#1:STA&B34
 2850 JSR djm:JMP coff
 2860 .dms LDA&B34:BEQ dpms
 2870 DEC&B35:LDA&B35:BNE dpms
 2880 LDA#145:STA&B35:LDA#0:STA&B34
 2890 JMP djm
 2900 .dpms RTS
 2910 .hmk LDX&7E:CPX#7:BNE dpms
 2920 LDX&85:CPX#208:BNE dpms
 2930 LDA&B09:CMP#48:RTS
 2940 .cfel LDA&B36:BNE dpms
 2950 LDA&B02:CMP#49:BNE dpms
 2960 INC&B36:INC&B08:JMP sc1
 2970 .hmm LDA&7E,X:SEC:SBC#4
 2980 CMP&7E:BCS mnd
 2990 ADC#8:CMP&7E:BCC mnd
 3000 LDA&85,X:CLC:ADC#8:CMP&85:BCC mnd
3010 SBC#12:CMP&85:BCS mnd
3020 LDA#19:STA&B32:LDA#0:RTS
3030 .mnd LDA#1:RTS
3040 .sou STX&B43:STY&B45:STA&B47
3050 LDA#255:STA&B44
3060 LDA#7:LDX#&41:LDY#&B:JMP oswo
3070 .wai TXA:PHA:LDA#19:JSR osby
3080 PLA:TAX:DEX:BPL wai:RTS
3090 .soo LDA#210:LDY#0:JMP osby
3100 ]NEXT:*FX3,2
3110 *FX18
3120 *KEY0 L%=&1900:REPEAT:L%=L%+?(L%+3
):UNTIL $(L%+4)="THEEND"|M?(L%+1)=&FF|MO
.|M60|MRUN|M
3130 RESTORE3230
3140 FORI%=&2C47TO&2FE3STEP4
3150 READ D$:!I%=EVAL("&"+D$)
3160 NEXT
3170 FORI%=&C00TO&C3CSTEP4
3180 READ D$:!I%=EVAL("&"+D$)
3190 NEXT
3200 *FX138,0,128
3210 END
3220 REM PLOTTER
3230 DATA 718500A9,48FF4998,A84A4A4A,A9
76854A,72656A00,98708508,2876650A,718573
65,768500A9,76260A8A,A76260A,70657626,76
A57085,3107165,8550E938,7296871,70857005
,47204860
3240 DATA B9A8682C,79850C00,850C10B9,C2
0B97A,30B97585,A078850C,4871A500,A54870A
5,A5748578,85072970,2970A57B,847085F8,B1
76A476,7684C879,70517BA4,C0C87091,8426F0
08,D074C67B
3250 DATA 1879A5E8,79857865,7AE60290,86
96818,69687085,38031000,718550E9,AFD075C
6,A500A060,80691870,71A57085,3100269,855
0E938,20C4D071,A02C47,6070B1
3260 REM SPRITE DATA
3270 DATA 50500,373700,55553737,F000000
,3F333333,3F3F3F3B,FFFFBF3F,0,2A000000,2
A00113B,3B3B2A,0,37150000,15150022,3737,
3333330F,3F3B3F3F,FF7F3F3F
3280 DATA FF,A0A,3B003B3B,AAAA3B,500000
0,15000005,11111515,11151515,33330F11,3B
3F3F33,BF3F3F3B,AAFFBBBB,0,0,0,0,0,0
3290 DATA 0,330F0000,3F3F3333,3F3F3733,
FF77777F,A0A0055,2A2A0000,2A22222A,22222
A2A,0,0,0,F000000,15332727,373F3F3F,7F7F
7F37,A007777,2A2A0A0A
3300 DATA 2A2A2222,AA22222A,5050000,111
51505,15151511,551111,331B1B0F,3F3F3F2A,
BFBF3B3B,BBBBBF,0,0,0,0,37220000,3737001
5,5555,27270F00
3310 DATA 3F3F3F33,BF3F3F3F,FFFF,A0A0A0
0,3B2A0000,3B2A0011,BB,50505,22371500,77
371500,1B0F0000,3F3F331B,3F3F3F3F,FFFF7F
,0,2A3B1100,AA3B3B00,AA
3320 DATA AF5F5F05,AFAF0A55,F00AA5F,55A
F0F,55AF0F0A,33111100,11333333,55000011,
33333300,33333333,FF333333,3322FFFF,3337
373B,22333333,AAFFAA,22220000,2222,0
3330 DATA 15151500,3F005515,3F3F3FFF,BF
2AFF3F,7F3F3F3F,BFBF2AAA,AA7FBF,0,333311
11,11113333,0,33333333,33333333,3333,3B3
32200,33333737,223333,0
3340 DATA 22222200,22,3170100,5000001,5
5000005,2B030200,F033C03,FF0F0F0F,301FFF
F,33C0317,F0F0F0F,FFFFFF,2032B02,A0A0000
,AA0000,C5D5D04,8045D0C,4550408
3350 DATA 2EAE080C,AB03FF0C,5DFF000C,5D
04FF5D,3FF0C1D,FF000C57,8FFAEAE,C0CAEAE,
40408AE,C08AA08,3171500,5000001,5000500,
AB2B0200,F167D16,FFF0FFF,17010FFF,29BE29
57
3360 DATA FF0FFF0F,FFF0F,2032B2A,A0000,
A000A,4000000,C0C0C0C,408045D,C,C0C0C08,
C0C030C,FF00,C0C0400,C030C0C,FF000C,C080
000,AE0C0C0C,C080408
3370 REM CO-ORDINATES
3380 DATA 9E714417,5225F8CB,E3C7937F,B3
7F4B17,2D2D2D2D,2E2E2D2D,2E2E2E2E,2F2F2F
2F,3030303,3030303,4040404,4040404,F0F0F
0F,F0F0F0F,D070D05,D0D0D0D
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 =    0 0
  50 = FEAB B
  60 = 916A 6
  70 = 82A3 3
  80 = 51FD 1
  90 = 5C2A 8
 100 = 3CEC B
 110 = 8FF7 4
 120 = B63C E
 130 =  B40 6
 140 = C00E E
 150 = 7AEC 3
 160 = D861 1
 170 = 9538 6
 180 = C2E6 5
 190 = B24C 0
 200 = D7F3 3
 210 = B1FD F
 220 = 8C4D 9
 230 = F6E9 5
 240 = 8103 6
 250 = B844 5
 260 = 7E45 7
 270 = 98BE F
 280 = 7F5A D
 290 = 33EB 5
 300 = 65EF C
 310 = 7474 7
 320 = 1637 B
 330 = DAC0 D
 340 = 16E5 6
 350 = FEE2 C
 360 =  C07 A
 370 = BBAF 5
 380 = 6752 6
 390 = 4F6E F
 400 = 6774 9
 410 = 3F80 B
 420 = BBC3 3
 430 = D188 6

 440 = EEFB D
 450 = B26D C
 460 = A8D7 4
 470 = 9EA5 C
 480 = AF87 0
 490 = 9B16 C
 500 = ED0F A
 510 = 8784 9
 520 =  76B B
 530 =  E75 5
 540 = 88C2 6
 550 = 528A 3
 560 = 2C83 5
 570 = 7CA7 1
 580 = 7EAE B
 590 = F716 A
 600 = 3AE0 F
 610 = 69B4 F
 620 = ED0F 8
 630 = F5B9 B
 640 = 2579 4
 650 = 4BD1 6
 660 = FF50 4
 670 = 7483 D
 680 = EC41 C
 690 = FC76 1
 700 = 9BBA 9
 710 = BEA8 D
 720 = DC9C 2
 730 = 84FE 3
 740 = 78D4 0
 750 = 99B6 5
 760 = CFF9 D
 770 = 505C 3
 780 = 3F21 4
 790 = DA9F C
 800 = 3711 1
 810 = 1E40 1
 820 = 24BD 9
 830 = 94E9 A
 840 = 1426 7
 850 = 10C0 7
 860 = 30A5 0

 870 = 5B4D 2
 880 = B499 C
 890 = ED0F 0
 900 = FE86 F
 910 = 3018 6
 920 = BA00 B
 930 = 4B90 E
 940 = 41A0 A
 950 = CDBF 6
 960 = 217B F
 970 = A450 0
 980 = 8A02 4
 990 = 7413 0
1000 = EA67 F
1010 = E4E4 C
1020 = E8D3 D
1030 = DE4C A
1040 = A236 2
1050 = 79AB 6
1060 =  5E5 5
1070 = 19E2 7
1080 = 47E7 4
1090 = 5166 6
1100 = 7953 D
1110 = E892 A
1120 = 2A26 6
1130 = 4521 A
1140 = B0C3 0
1150 = 3BFA 7
1160 = 6777 0
1170 = 344C 2
1180 = 2E10 F
1190 = 46CF A
1200 = F15D C
1210 = F917 2
1220 = CB82 3
1230 = 97F9 B
1240 = 650A D
1250 = 8C45 5
1260 = 25E2 0
1270 = 9F2C 9
1280 = 4278 4
1290 = 9E00 2

1300 = 77AE 2
1310 = D787 8
1320 = 7FB0 9
1330 = 5906 9
1340 = 5EA7 E
1350 = CCD7 8
1360 = 95DB 1
1370 = 412A 2
1380 = F709 4
1390 = 5036 A
1400 =  100 5
1410 = EFC9 D
1420 = AC33 7
1430 = E3C5 C
1440 = 1EF3 4
1450 = 91E8 9
1460 = 613B D
1470 = 880A 8
1480 = F19C 7
1490 = 2AC5 9
1500 = 9370 7
1510 =  92A A
1520 = D5F1 9
1530 = B3F2 2
1540 = E318 8
1550 = 511B B
1560 =  2EE 4
1570 = 44C1 E
1580 = D297 4
1590 = 9F20 B
1600 = A0F6 9
1610 = 97CD 9
1620 = E5CF 2
1630 = 932D 0
1640 = C0E9 6
1650 = 3A4F 2
1660 = 6D99 A
1670 = 5671 7
1680 = 86BA 9
1690 =  403 A
1700 = A2BB 7
1710 =  2F5 1
1720 = A8AD 4

1730 = A507 1
1740 = 1B09 9
1750 = A8DB 4
1760 = 8F34 6
1770 = 739F 3
1780 = ADBA D
1790 = 4343 1
1800 = 7E61 2
1810 = D072 4
1820 = C815 7
1830 = BE03 8
1840 = 405A 7
1850 = 5A82 9
1860 = 4F7D 1
1870 = 28C3 F
1880 = 76A6 B
1890 = 6C9E E
1900 =    B 1
1910 = 1AC7 7
1920 = C0E5 C
1930 = 2EF0 5
1940 = A2E9 9
1950 = 4918 A
1960 = 705C 0
1970 = 2CF0 6
1980 = 3B22 7
1990 = 9CAA 6
2000 = EDBD 1
2010 = CCB5 0
2020 = 606A 4
2030 = 5503 5
2040 = F7F2 B
2050 = C428 B
2060 = A318 5
2070 = 5D56 3
2080 = 5ABB 0
2090 = 97BB A
2100 =  B7E B
2110 = D45F 2
2120 = A1A0 0
2130 = DF8F 3
2140 = 1A78 2
2150 = E2CD 8

2160 = 7F6F B
2170 = CCE2 4
2180 = 7A62 D
2190 = 683D 8
2200 = 7744 E
2210 =  EA8 8
2220 = C434 3
2230 = E2F0 E
2240 = 9C1E F
2250 = 829E 8
2260 = 31F9 1
2270 = 9D6D E
2280 = 8BE8 4
2290 = 71E6 9
2300 = 374C F
2310 =  4A2 1
2320 = 9122 9
2330 = A157 F
2340 = BE3F B
2350 = F84A 3
2360 =  4A2 A
2370 = BACC D
2380 = A157 C
2390 = 4BEC D
2400 = EBF6 1
2410 = 377D D
2420 = 19E5 8
2430 = 7B6D 5
2440 = EBF6 D
2450 =  C91 D
2460 = C202 8
2470 = D267 8
2480 = 99FC A
2490 = 8971 D
2500 = B7B0 5
2510 = D6A1 1
2520 = 56B1 0
2530 =  1F9 E
2540 = 142E 0
2550 = 9BB7 6
2560 = 6516 2
2570 = 9950 B
2580 =  321 8

2590 = 1CB8 9
2600 = 8A3A A
2610 = 87DC 8
2620 = 11C4 2
2630 = 3371 6
2640 = F843 A
2650 = 5AEA 9
2660 = C393 6
2670 = A597 C
2680 = E4C9 8
2690 =  A4F 0
2700 = 4C9A 0
2710 = F526 B
2720 = 831D A
2730 = 997A B
2740 = 1C39 1
2750 = DC5C C
2760 = B7F8 E
2770 = C439 C
2780 = B573 A
2790 = AB85 0
2800 = 4B38 6
2810 = 1894 E
2820 = 9E6C D
2830 = 86D4 E
2840 = DF12 6
2850 = 1642 E
2860 = 45AD B
2870 = 91AC A
2880 = 20B7 0
2890 = 36CC A
2900 = 9F3D C
2910 = 72E6 5
2920 = 2A8D 4
2930 = B09E 0
2940 = EA82 E
2950 = 8D71 8
2960 = 41B3 B
2970 = AED7 F
2980 = 407E 2

2990 = 7EC1 9
3000 = F0D7 3
3010 = 78D2 A
3020 = B6A4 C
3030 = 93D3 9
3040 =  AC6 A
3050 = 739C 2
3060 = 5D3A F
3070 =  284 D
3080 = 79F8 7
3090 = 58B4 7
3100 = 88FA 9
3110 = 718F 1
3120 = 876E F
3130 = 1C0C D
3140 = 12E2 C
3150 = D03D 9
3160 = 2C83 4
3170 = 81E1 D
3180 = D03D 6
3190 = 2C83 C
3200 = 5DEC 5
3210 = FD2E F
3220 =    0 F
3230 = B670 0
3240 = E494 C
3250 = D024 9
3260 =    0 9
3270 = 9376 7
3280 =  983 0
3290 = 2422 3
3300 = 353F 0
3310 = 2079 3
3320 = 8D9C E
3330 = 5BE2 0
3340 = D758 8
3350 = 4285 4
3360 = BB76 B
3370 =    0 B
3380 = A0F5 3
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MICRO USER CLASSIFIEDS

● ARC-PCB £120. Artisan £15. Graphic Writer £15. Tel: 01-399 2669.

● BBC B. PC case with fan, Watford DDFS, dual 40/80 Teac drives with separate power supply. Watford 32k shadow ram, 32k sideways ram, monochrome TV, Interword, ISO Pascal & software & books. £270. Tel: 0732 62583.

● BBC B, Acorn DFS + Opus Challenger 3, 80T/DSDD with 512k ram disc £280. Viglen 28Mb hard disc £375. Acorn teletext £70. Turbo upgrade £90. Commodore 64 £90. Phone: 061-927 7650 after 7pm.

● BBC B, very good condition, plus software. £150. 0732 863519.

● Torch Z80 2nd Processor inc word processor, spreadsheet, database, Mbasic, utility programs. Also includes: roms + five manuals £80. Tel: 0655 82348.

● Archimedes 310M colour, Risc OS, 20Mb Winchester 4 slot backplane, 5.25in disc buffer £1.195. Tel: Ruislip (0895) 621224.

● Master 512 40/80T drive, 30 meg Winchester, printer, monitor, software and books plus modem and joystick £950 ono. Tel:061-973 8063.

● Acorn 8271 DFS complete with fitting instructions for sale. All ICs are numbered with IC position £25. Ring 0532 713598 ask for Chris.

● BBC B, Watford DDFS, Sanyo monitor, AMX Mouse, rom/ram board, games, Dumpout 3, manuals, cost over £800, giveway at £325. Tel:0923 30663.

● Master 128k, DS 40T drive, 120D printer, AMX Mouse with software, Quickshot joysticks, software galore; too numerous to mention!, books and manuals. £600 the lot! Call Andy and find out more. Tel: 0606 75247.

● BBC B issue 7, Viglen case, DS80T drive, colour monitor, sideways rom/ram board, joysticks. £450 ono. Tel: Basingstoke (0256) 23041.

● Electron ISO Pascal cartridge wanted. Other roms of interest also Good Price. Tel: 0750 20754.

● BBC B with DDOS 3.45, Wordwise 1.20 and manuals £175. R.H. Electronics Video Digitiser plus camera £150. Tel: 0203 448500 after 6pm.

● BBC Master Compact 128k, Dumpout 3.02 rom, MOS 5.00 TV modulator, View 3.0, Logo 1.0, anti-glare VDU screen, 3.5in 40/80 disc drive, 1+2 Master reference manuals (adv), games, GXR rom, Image bought Sept 1987. Telephone Lincoln 0522 21174 £330 ovno.

● Watford 32k shadow screen board for Model B. Perfect working order. £35 ono. Hatfield (0707) 276761.

● Sega system including seven games with additional joystick. Absolute bargain at £150 Tel: 0274 876154.

● Brand new Watford CLS35 400k 3.5in single disc drive £50. Tel: 0233 629868.

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● BBC B issue 7, 40/80 drive, rom board + software incl Exile £295 ono. Thame (084421) 4870.

● 65C102 co-processor, boxed, brand new, support-disc booklet, swop 512 Proc or offers. Tel: 0306 882044, 0306 885900.

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● Facit 4510 printer. Heavy duty office quality. 80 column printing speed 120 cps. Write to: Mr H.V. Willings, 9 High View, Burnt Yates, Harrogate HG3 3HH.

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● BBC B, twin 5.25in/3.5in 40/80T, 14 roms, AMX Mouse, games, printer, monitor £350. Tel: 0525 403926.

● Archimedes 310M base system. Purchased 12/4/89 invoice as proof, selling to upgrade. Boxed as new. £700 Phone: 0428 2083 or 54182.

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- Cumana Touch Pad for BBC, new £40 inc. Electron data recorder model ALDO3, new £30 inc. BBC Micro power supply unit, new £15.80 inc. Magazine back issues, SAE for list. books 6502 machine code £3 inc. M. Small, 8 Cherrytree Road, Chinnor, Oxford OX9 4QY.
- Cumana single disc drive £50. Call Mark on Gravesend 320624.
- Master 128, 40/80T drive, hi-res green monitor, Overview, manuals, software (Elite, Time & Magik, Colussus Chess etc). £460, may split. Tel: 01-886 4040.
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- Microvitec 1451AP colour monitor £170. Acorn Teletext Adaptor, ATS ROM. £65 Tel: 0745 583930 (N. Wales).
- AMX Stop Press, roms, discs and mouse. Also additional font disc. £55. Tel: Thanet 31086.
- Master, Watford Le Modem, Dumpmaster rom, Quest Paint, Quest Mouse £470. Telephone 092945 363. Ask David for any offers.
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You're taking a risc using that arm

Continuing the light hearted Bob and Trev saga – with something quite new in reviews

Dear Trev

Dear Trev,

Ou sont les neiges d'antan? Which, as you'll know, means where are my aunt's horses? What happened to those golden days when the BBC Micro was a Model B and being limited to 32k was more than a memory? Gone, all gone, as Clive is heard to say so wistfully, so often. Of course in his case it's because he's come to the end of yet another glass of Boddards – the North's answer to Perrier water: More fizz, less alcohol content.

Forgive this nostalgic mood, but I've just been in contact with the lads at Database again.

"Wally", they yelled over the phone, "how would you like to review the new BBC Micro?"

"Don't you mean the Archimedes 3000?" I replied naively, "that's what it's called in the adverts".

"Yes, but when the advert's on the BBC it's called the BBC Micro. Well, do you want to *risc* doing it or not? We reckon you're *arm*less enough".

Did I? Did I refuse to review the Electron when it came out? Eventually. Did I miss the chance to plumb the depths of the Master when it was released? Or explore the intricacies of the Compact when it escaped? Of course not. I'm too stupid. Which is how I found myself confronted by a spanking new Archimedes 3000/BBC Micro/Arm.

I could see at once why Mike Cook hadn't reviewed it – there just weren't enough ports. If there's one thing Mike likes doing it's sticking things into the backs of micros so it's no surprise that he said he wouldn't touch the Archimedes – on principle.

I'd only agreed to do it because I felt my life needed a challenge. I'd been inspired by the news that Andrea had not only reached Everest's summit but had also rung a peal on a set of handbells – the high point of her campanology career. Using the Arm machine was to have been the high point of mine. Unfortunately Doreen was there to help.

"Look at it", I chortled," my very own Risc machine". As I hoped, Doreen asked: "Why's it called Risc?"

"Because only Acorn would risk selling it", I replied quick as a flash. Doreen just looked at me. That probably doesn't mean much to you but then you haven't seen one of Doreen's looks. Take it from me, she could stare down Medusa. After a five second eternity I cracked.

"Because it's a Reduced Instruction Set Computer. It doesn't have as many instructions as the old 6502".

"Well, I hope they knock something off the price for the ones that are missing".

"No, it's not like that. What I mean is that the instructions themselves don't do much but they do it very quickly".

"You've got a lot in common then", she said. I tried to change the subject.

"Look, it's got a mouse".

"Eek", she screamed, jumping on a chair. "Buster, get it".

At this point Buster – who'd been following his usual ploy of pretending to have just come back from the taxidermist whenever Doreen's around – sprang into life and attacked my poor little peripheral.

"Get off, you brute", I yelled, worried about the ball.

"Don't talk to me like that", Doreen screamed landing a blow in my expansion port. Buster took this opportunity to escape and eventually order was restored. I went back to expounding the joys of the Barch as it's come to be known chez nous – which is not a reference to a Cuban revolutionary.

"Look it's got Wimps".

"So've I".

"And the monitor lead's too short".

"You should complain".

With desperation I tried to click on one of the icons but nothing happened. While D. murmured about icons with feet of clay I discovered you had to press the mouse twice.

"This is the Task Master".

"That's sexist".

"Well, what about the ram disc?"

"Disgusting".

I escaped into Arm Basic V.

"Did they have to have five goes to get it right?"

"You can pass parameters", I informed her hopefully.

"Not with me you can't".

I'll draw a veil over the rest. Needless to say Doreen wasn't much help with the review. Nor was she impressed when Clive gave her an *Archimedes owners do it with wimps* badge. Still, c'est la vie as the French write on their toilets.

Cheers,

Bob

PS. I've just seen those photos of Yeti taken by the Accrington Stanley Everest Expedition. I'm not sure, but something about them rings a bell.

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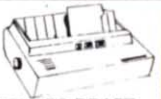

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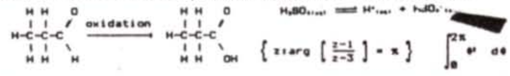

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U.I.M. is disc only and will run on BBC B or B+ with sideways RAM and Master Series Computers.

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